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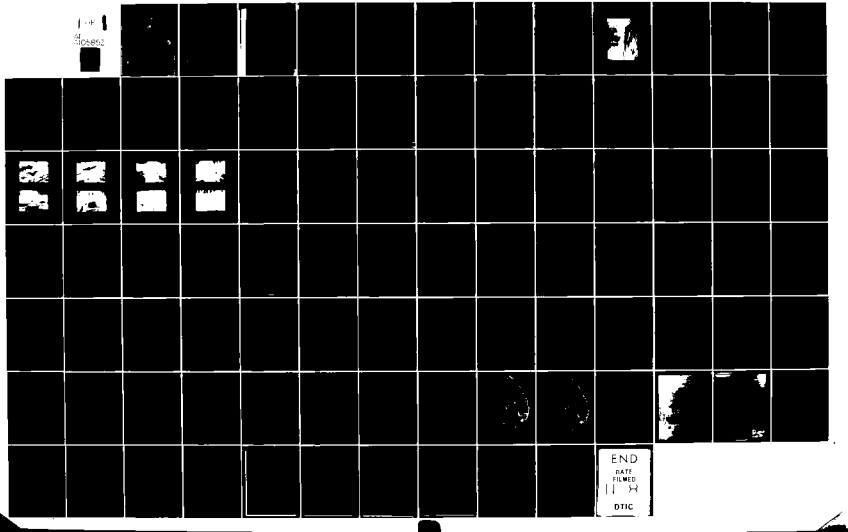

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. → (over)

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Using the Corps of Engineers' screening criteria, it has been determined that the dam would be overtopped for all storms exceeding approximately 23 percent of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged "seriously inadequate," and the dam is assessed as unsafe, non-emergency.

The "unsafe" classification applied to a dam because of a "seriously inadequate spillway" is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. However, it does mean that, based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity, so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream.

No signs of instability were noted in the embankment; therefore, a stability analysis is not considered necessary at this time. It is recommended that, within three months of owner notification, detailed hydrologic and hydraulic investigations of the structure should be undertaken to more accurately determine the site-specific characteristics of the watershed and their effects upon the overtopping potential of the dam. The results of this investigation and analyses will determine the appropriate remedial measures required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance must be provided during these periods.

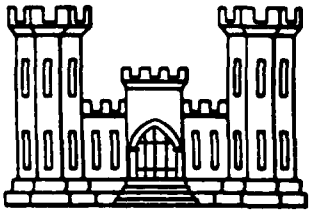
Regular inspections should be made of the dam and appurtenant structures. A thorough checklist should be compiled for use by the owner's representative as a guide for the inspections. Maintenance items should be completed annually.

PASSAIC RIVER BASIN
LOWER HUDSON RIVER AREA

CONGERS LAKE DAM

ROCKLAND COUNTY, NEW YORK
INVENTORY NO. N.Y. 972

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

JUNE 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONGERS LAKE DAM
I.D. No. NY 972
DEC DAM No. 214A-290 PASSAIC RIVER BASIN
ROCKLAND COUNTY, NEW YORK

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Congers Lake Dam (I.D. No. NY 972)
State:	New York
County:	Rockland
Stream:	East Branch Hackensack River
Dates of Inspection:	10 January 1981 7 March 1981

ASSESSMENT

Examination of available documents and a visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property.

Using the Corps of Engineers' screening criteria, it has been determined that the dam would be overtopped for all storms exceeding approximately 23 percent of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged "seriously inadequate," and the dam is assessed as unsafe, non-emergency.

The "unsafe" classification applied to a dam because of a "seriously inadequate spillway" is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. However, it does mean that, based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity, so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream.

No signs of instability were noted in the embankment; therefore, a stability analysis is not considered necessary at this time. It is therefore recommended that, within three months of owner notification, detailed hydrologic and hydraulic investigations of the structure should be undertaken to more accurately determine the site-specific characteristics of the watershed and their effects upon the overtopping potential of the dam. The results of this investigation and analyses will determine the appropriate remedial measures required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF. In the interim, a detailed emergency action plan must be developed and implemented

during periods of unusually heavy precipitation. Also, around-the-clock surveillance must be provided during these periods.

Regular inspections should be made of the dam and appurtenant structures. A thorough checklist should be compiled for use by the owner's representative as a guide for the inspections. Maintenance items should be completed annually.

The following remedial measures must be completed within one year.

1. Fill and compact low areas along the crests. Seed or riprap the area.

2. Regrade the upstream slopes to the original design of 1V:3H and riprap to the original height of 3 feet above the normal pool level.

3. Fill, compact, and seed areas where runoff from the crests has eroded soil from behind the stone walls on the downstream sides of the embankments.

4. Remove trees and brush from the embankments, crests, and areas within 20 feet of the downstream toe. Root systems for trees with a trunk diameter greater than 3 inches should be removed and the resultant holes backfilled, compacted and reseeded.

5. Install a staff gage to monitor reservoir levels above normal pool.

SUBMITTED: _____
Granville Kester, Jr., P.E.
Vice President
MICHAEL BAKER, JR. of New York, INC.

APPROVED: _____
Colonel W.M. Smith, Jr.
New York District Engineer

DATE: 30 JUN 1981

Overall View of Dam
Congers Lake Dam
I.D. No. NY 972
10 January 1981

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONGERS LAKE DAM
I.D. No. NY 972
DEC DAM No. 214A-290
PASSAIC RIVER BASIN
ROCKLAND COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority - The Phase I Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection - This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances - Congers Lake Dam is an earthfill dam consisting of two embankments separated by an area of high natural ground. The left[1] embankment is approximately 290 feet long and 7.8 feet high.[2] The natural ground separating the embankments is 152 feet long and has a maximum height of about 1 foot above the embankment crests. The right embankment is 268 feet long and rises to a maximum height of about 4.8 feet above the existing ground. The upstream slopes on the left and right embankments are 1V:1.6H (Vertical to Horizontal) and 1V:2H, respectively. The downstream faces of both embankments consist of a vertical stone wall. The crest widths of the left and right embankments average

[1]Facing downstream.
[2]Measured from the downstream toe of the dam to the minimum top of dam elevation.

22 feet and 17 feet, respectively, and minimum crest elevations on the left and right embankments are 998.7 feet T.B.M.[3] and 1000.9 feet T.B.M., respectively. A wood sheathing seepage barrier driven into the foundation soils is included in the entire length of the upstream embankment, according to the design drawings. The spillway is cut into the left embankment about 100 feet from the left abutment and has a crest elevation of 996.4 feet T.B.M. A vertical concrete pier forms the right edge of the spillway. The left edge of the spillway slopes to the embankment crest at about a 1V:3.5H slope. Bottom width of the spillway is 35.5 feet. The bottom of the spillway is made of stone and broken concrete, covered with asphalt (Photo 1). A concrete pier, 3 feet wide, is located in the spillway about 10 feet left of the right edge of the spillway and a concrete slab has been laid over the spillway between the pier and the right edge of the spillway. There are no outlet works for Congers Lake Dam.

b. Location - Congers Lake Dam is located on the East Branch Hackensack River in Rockland County, New York, approximately 1 mile southeast of the unincorporated community of Congers. A Location Plan is included in Appendix E of this report.

c. Size Classification - Congers Lake Dam is 7.8 feet high and the reservoir storage capacity at the crest of the dam (elevation 998.7 feet T.B.M.) is 466 acre-feet. Therefore, the dam is in the "small" size category as defined by the Recommended Guidelines for Safety Inspection of Dams (Reference 15, Appendix D).

d. Hazard Classification - Five homes are located within 800 feet of the downstream end of the dam. Gilchrist Drive crosses East Branch Hackensack River about 875 feet downstream of the dam. There is danger of loss of human life from large flows downstream of the dam. Congers Lake Dam is therefore considered in the "high" hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

[3]All elevations are referenced to a Temporary Bench Mark (T.B.M.) located on the right downstream corner of the concrete slab over the right side of the spillway, with an assumed elevation of 1000.0 feet.

e. Ownership - Congers Lake Dam is owned by the Town of Clarkstown, New York. The contact person is Mr. Ed Ghiazza (Telephone 914-634-4100).

f. Purpose of the Dam - The dam is used to impound water for recreational purposes.

g. Design and Construction History - Congers Lake Dam was originally constructed around 1892 by the St. Rita Lake Company. The spillway was rebuilt and/or repaired around 1912, 1914 and again at some later date.

h. Normal Operating Procedures - The reservoir is normally maintained at the crest of the spillway, elevation 996.4 feet T.B.M.

1.3 PERTINENT DATA

a. Drainage Area - The total drainage area upstream of Congers Lake Dam is 4.10 square miles. Rockland Lake located about 10,500 feet upstream of Congers Lake Dam, controls an area of 2.31 square miles. The discharge from Rockland Lake and runoff from an additional area of 1.04 square miles flows into Swartwout Lake, located about 5500 feet upstream of Congers Lake Dam. Discharge from Swartwout Lake Dam and runoff from an additional drainage area of 0.75 square mile flows into Congers Lake.

Total Drainage Area (square miles) -	4.10

b. Discharge at Dam cubic feet per second (c.f.s.) -

Spillway at Top of Dam (Minimum)	337.0

c. Elevations (T.B.M. Datum) -

Average Top of Dam -	1001.2
Top of Dam (Minimum)	998.7
Spillway Crest	996.4

d. Reservoir Surface Area (Acres) -

Top of Dam (Minimum)	130.5
Spillway Crest	112.3

e. Reservoir Storage Capacity (Acre-Feet) -

Top of Dam (Minimum)	466.0
Spillway Crest	187.0

f. Dam -

Type: Homogeneous earth embankment with wood sheathing seepage barrier and stone retaining walls supporting the downstream side.

Length (Feet)	
Left Embankment	290.0
Right Embankment	268.0
Slopes (Vertical:Horizontal)	
Left Embankment Upstream	1:1.6
Downstream	Vertical
Right Embankment Upstream	1:2.0
Downstream	Vertical
Crest Width (Feet)	
Left Embankment	22.0
Right Embankment	17.0

g. Spillway -

Type: Uncontrolled, irregular shaped opening of stone, broken concrete with asphalt coating

Bottom Length Perpendicular to Direction of Flow (Feet)	35.5*
Length at Crest Perpendicular to Direction of Flow (Feet)	43.0*

h. Reservoir Drain - None

*Includes 3-foot wide concrete pier.

SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

Congers Lake Dam is located in the "Triassic Lowland" physiographic province of New York State. The province is situated entirely in Rockland County, and is characterized largely by Triassic Period (180 to 225 million years ago) sedimentary strata that have been subjected to block faulting and intrusion of the Palisades diabase sill. The Lowland is bounded on the east by the Palisades sill forming a precipitous ridge and on the north by the sill and the Triassic border fault. The province is situated on the downthrown side of the fault. Drainage from the sedimentary strata exposed is to the south and is generally controlled by north-south joints. The region has been repeatedly glaciated by the major ice sheet advances which occurred during the Pleistocene Epoch. The most recent ice advance occurred approximately 11,000 years ago. Local bedrock consists of red mudstone and feldspathic sandstone, and gray arkosic sandstone, according to available geologic maps by J. G. Broughton (1970) and others (References 1, 2 and 3, Appendix D). These strata are part of the Newark Group, Brunswick Formation, which has been determined to be Upper Triassic age.

2.2 SUBSURFACE INVESTIGATION

Original subsurface data is very limited. According to the available soils report (preliminary) for Rockland County, prepared by the USDA Soil Conservation Service (Reference 4, Appendix D), local surface materials consist of "Wethersfield loam" soils. These soils are deep red, well drained loam or silty soils which have developed in low lime glacial till dominated by sandstone. At depths from 2 feet to 4 feet, the soil becomes extremely firm. This condition persists to depths of 6 feet or more. The presence of hardpan (the above extremely firm and usually clayey material) is shown on the available design drawing (Plate 2, Appendix E). The masonry portions of the dam are founded on this layer.

2.3 DAM AND APPURTENANT STRUCTURES

The Congers Lake Dam was originally constructed around 1892 by the St. Rita Lake Company for recreational purposes. The structure has essentially remained the

same with the exception that the spillway was rebuilt and/or repaired around 1912, 1914 and again at a later date.

The dam is an earthfill type with uncemented stone retaining walls supporting the downstream embankments (there are two separate embankments divided by a natural knoll). A seepage barrier of wood sheathing was driven into the foundation soils during construction on the upstream side of the dam and incorporated within the embankments (Plate 2, Appendix E). Two 12-inch cast iron outlet pipes were designed immediately left of the spillway for regulation of the lake level. The original spillway was an open rectangular channel 30 feet wide with masonry side walls and a paved concrete bottom. Riprap covered the original upstream slope with the exception of the top few feet.

At some later date the spillway was reconstructed because its paved bottom was being undercut and washing was occurring behind the masonry side walls. From field observations for this investigation, it appears that concrete piers were last installed across the spillway for stoplogs or liftgates. These structures have deteriorated badly and have been partly knocked out (Photo 3). The 12-inch outlet pipes were not found during the field inspection.

2.4 CONSTRUCTION RECORDS

The available records consist of a drawing labelled General Plan of Dam, which was compiled during 1914, and an application submitted to the New York State Conservation Commission for reconstruction of the spillway on 30 March 1914. The plan is included in Appendix E as Plate 2. The application and a letter discussing the origin of the design drawing are included in Appendix F as background documentation.

2.5 OPERATION RECORDS

No operation records were found during this investigation.

2.6 EVALUATION OF DATA

Engineering data were obtained entirely from files of the New York State Department of Environmental Conservation. The available data are considered adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General - The visual inspection of Congers Lake Dam was conducted on 10 January 1981. The weather was cold and windy, with temperatures ranging from 5°F to 10°F. At the time of the inspection, approximately 6 inches of snow covered the ground. The reservoir was frozen and the elevation of the ice on the reservoir was 996.7 feet T.B.M. Deficiencies found during the inspection will require remedial treatment. A Field Sketch of conditions found during the inspection is included in Appendix E. The complete Visual Inspection Checklist is presented as Appendix B. Because there was a snow cover on the dam during the initial inspection, a follow-up inspection was carried out on 7 March 1981.

b. Spillway - At the time of the inspection, the spillway was found to be badly deteriorated. Only part of the old lift gate or stoplog structure is still present. The left stone wall that originally protected the embankment has collapsed. The bottom of the spillway was very irregular and partly protected from erosion by a combination of stone, concrete and asphalt. There is an abundance of riprap in the spillway discharge channel. Some logs, railroad ties and other debris are present, but are not clogging the channel.

c. Embankment - Both embankments are heavily overgrown with brush and large trees (Photo 4). The upstream slopes are moderately eroded. Wave action has caused a few vertical scarps approximately 2 feet high at the waterline. Little riprap was observed along the upstream slopes. The areas immediately downstream of the stone retaining walls are heavily overgrown with trees. The retaining walls are in good condition. Runoff from the crests has slightly eroded the embankment materials from behind the walls locally. The vertical alignment of the crest varies about 4 feet from the minimum top of dam to the maximum top of dam. The horizontal alignment was found to be satisfactory. Both crests were partly overgrown with large trees. No seepage, surface cracks, unusual movement at the toe or erosion, or sloughing at the abutments was observed; however, snow covered the embankments.

d. 7 March 1981 Inspection - The only additional deficiency noted during the second inspection was that there is a large eroded area on the crest and upstream face of the dam near the right abutment. This area is approximately 12 feet wide and a maximum of 2 feet deep. It is approximately 8 feet long, extending from the upstream face of the dam into the dam crest.

e. Outlet Works - No outlet works of any kind were observed during the inspection.

f. Downstream Channel - The channel downstream of the dam is a natural stream channel with trees and brush on the banks. The stream slope is shallow, approximately 0.2 percent, and the valley is wide with moderate side slopes.

g. Reservoir - The slopes surrounding the reservoir are gentle and moderately wooded or grass covered. Sedimentation, although not directly observed, is expected to be minor. No instrumentation for monitoring reservoir levels was observed.

3.2 EVALUATION

The visual inspection revealed several deficiencies in this structure. The following items were noted:

1. The spillway is badly deteriorated. On the left side, the stone wall that originally protected the embankment has collapsed and the bottom of the spillway was very irregular.

2. The vertical alignment of the dam varies about 4 feet.

3. Little riprap was observed along the upstream slopes with a few vertical scarps approximately 2 feet high at the waterline.

4. A large area of erosion was observed between the crest and the upstream face of the dam near the right abutment.

5. There is slight erosion behind the retaining walls from runoff from the crest.

6. The embankments are heavily overgrown with brush and large trees.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

There are no formal operating procedures. The operation of the dam is an automatic function controlled by the crest of the spillway at elevation 996.4 feet T.B.M.

4.2 MAINTENANCE OF THE DAM

Maintenance of the dam is the responsibility of the Town of Clarkstown. A regular inspection or maintenance schedule has not been instituted.

4.3 WARNING SYSTEM

At the time of inspection, there was no warning system or emergency action plan in operation.

4.4 EVALUATION

Past maintenance of the dam has been inadequate. Regular inspections should be made of the dam and appurtenant structures. A check list should be compiled by the owner's representative as a guide for the inspections. Maintenance items should be corrected annually. A warning system and emergency action plan should be developed and put into operation.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed above Congers Lake Dam was made using the Haverstraw, NY and Nyack, NY-NJ USGS 7.5 minute quadrangles. The drainage area is about 40 percent residential, 30 percent wooded, 15 percent open areas with the remaining 15 percent consisting of the lake surfaces of Congers Lake, Swartwout Lake and Rockland Lake. Slopes in the watershed vary from 35 percent in parts of the wooded areas to less than 2 percent in some of the low, open areas. The total drainage area above Congers Lake Dam is 4.10 square miles. A Watershed Map is included in Appendix E of this report.

5.2 ANALYSIS CRITERIA

A hydrologic analysis of the watershed and hydraulic analysis of dam was conducted using the U.S. Army Corps of Engineers' Flood Hydrograph Package HEC-1 DB computer program (Reference 12, Appendix D). The unit hydrograph was defined using the Snyder Unit Hydrograph Method. Estimates of Snyder hydrograph coefficients were based upon average coefficients from the Hydrologic Flood Routing Model for Lower Hudson River Basin (Reference 16, Appendix D). Precipitation data was taken from Hydro-meteorological Report No. 33 (Reference 8, Appendix D). Rainfall losses were estimated at an initial loss of 1.0 inch and a constant loss rate of 0.1 inch per hour thereafter. The hydraulic capacity of the dam, reservoir, and spillway was determined by incorporating the Modified Puls Routing Method. All flood routings were begun with the reservoir at normal pool level. Outlet discharge capacity was computed by hand. The Probable Maximum Flood (PMF) and 1/2 Probable Maximum Flood (1/2 PMF) were developed and routed through the reservoir.

5.3 SPILLWAY CAPACITY

The capacity of the spillway at the minimum top of dam was determined to be 337 cubic feet per second (c.f.s.).

5.4 RESERVOIR CAPACITY

The storage capacity of Congers Lake at normal pool is 187 acre-feet. The storage capacity of the reservoir at the minimum top of dam is 466 acre-feet. Therefore, flood control storage of the reservoir between the spillway crest and top of dam is 279 acre-feet. This

volume represents a total of 1.28 inches of runoff from the watershed.

5.5 FLOODS OF RECORD

No records concerning the effects of significant floods on the dam and spillway are available.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway is 337 c.f.s. before overtopping would occur. The peak outflow of the PMF is 7832 c.f.s. and the 1/2 PMF is 2521 c.f.s.. Therefore, the spillway is capable of passing 23 percent of the PMF before overtopping would occur.

5.7 EVALUATION

Congers Lake Dam is a "small" size - "high" hazard dam requiring the spillway to pass a flood in the range of the 1/2 PMF to PMF. The PMF and 1/2 PMF were routed through the watershed and dam. It was determined that the spillway is capable of passing 23 percent of the PMF before overtopping the dam. Therefore, the spillway is judged to be "seriously inadequate."

Conclusions pertain to present conditions and the effect of future development on the hydrology has not been considered.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF EMBANKMENT STABILITY

a. Visual Observations - No signs of instability were noted during the visual inspection. However, moderate erosion and sloughing has occurred on the upstream embankment slopes, especially at the water line, and on the left side of the spillway where the original masonry wing wall has collapsed and been removed. Also, runoff from the crests of the left and right embankments has locally eroded the embankments slightly by washing behind the downstream masonry support walls. The embankments are heavily overgrown by trees and high brush.

b. Design and Construction Data - Design, construction, and/or reconstruction data concerning the stability of the dam were not available.

c. Operating Records - Operating records are not available.

d. Post Construction Changes - No post construction changes have been made which affect the stability of the structure. The Town of Clarkstown has made application to the U.S. Department of the Interior, Bureau of Outdoor Recreation, for a grant to make local park improvements. Part of the program includes reconstruction of the Congers Lake Dam spillway.

6.2 STABILITY ANALYSIS

The results of previous stability analyses were not available for reference during this evaluation. The embankments are assumed to be homogeneous types constructed of sandy silt. The left embankment is 7.8 feet high and the right embankment is 4.8 feet high. The crest widths of the left and right embankments are approximately 22 feet and 17 feet, respectively. The upstream slope of the left embankment was measured as being 1V:1.6H. The upstream slope of the right embankment is 1V:2H. The downstream slopes are supported by nearly vertical stone (uncemented) walls. No facilities are available to draw down the reservoir as observed during the visual inspection.

The upstream slopes are overly steep; however, there were no signs of instability. There are no signs of instability related to the stone walls supporting the downstream slopes. The existing crest widths are more than adequate. A stability analysis is not considered necessary at this time.

6.3 SEISMIC STABILITY

Congers Lake Dam is located in Seismic Zone 1 which presents no hazard from earthquakes, according to the Recommended Guidelines for Safety Inspection of Dams. This determination is contingent on the requirements that static stability conditions are satisfactory and conventional safety margins exist.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety - Examination of available documents and visual inspections of Congers Lake Dam did not reveal any conditions considered to be hazardous.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 23 percent of the PMF. The overtopping of the dam could result in dam failure, increasing the hazard to loss of life downstream. Therefore, the spillway is adjudged as "seriously inadequate," and the dam is assessed as unsafe, non-emergency.

The "unsafe," classification applied to a dam because of a "seriously inadequate spillway," is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. However, it does mean that, based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream of the dam.

No signs of instability were noted in the embankment; therefore, no stability analysis will be required.

b. Adequacy of Information - The information available and the observations and measurements made during the visual inspection are considered sufficient for this Phase I Inspection Report.

c. Need for Additional Investigation - Detailed hydrologic and hydraulic investigations of the watershed and reservoir area are considered necessary to more accurately determine the overtopping potential of the dam.

d. Urgency - The detailed hydrologic and hydraulic investigations must be initiated within three months of owner notification. Within one year, remedial measures resulting from these investigations must be initiated, with completion of these

measures during the following year. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance must be provided during these periods. The problem areas listed below must be corrected within one year of notification.

7.2 RECOMMENDED MEASURES

Regular inspections should be made of the dam and appurtenant structures. A thorough checklist should be compiled for use by the owner's representative as a guide for the inspections. Maintenance items should be completed annually.

A formal warning system and emergency action plan should be developed and put into operation as soon as possible.

The following remedial measures must be completed within one year.

1. Fill and compact low areas along the crests. Seed or riprap the area.

2. Regrade the upstream slopes to the original design of 1V:3H and riprap to the original height of 3 feet above the normal pool level.

3. Fill, compact, and seed areas where runoff from the crests has eroded soil from behind the stone walls on the downstream sides of the embankments.

4. Remove trees and brush from the embankments, crests, and areas within 20 feet of the downstream toe. Root systems for trees with a trunk diameter greater than 3 inches should be removed and the resultant holes backfilled, compacted and reseeded.

5. Install a staff gage to monitor reservoir levels above normal pool.

APPENDIX A

PHOTOGRAPHS

CONTENTS

Note: Photographs were taken on 7 March 1981.

CONGERS LAKE DAM

Photo 1. Spillway and Left Abutment
7 March 1981

Photo 2. Spillway and Adjacent Embankment, Knoll Between Left and Right Embankments in Background
7 March 1981

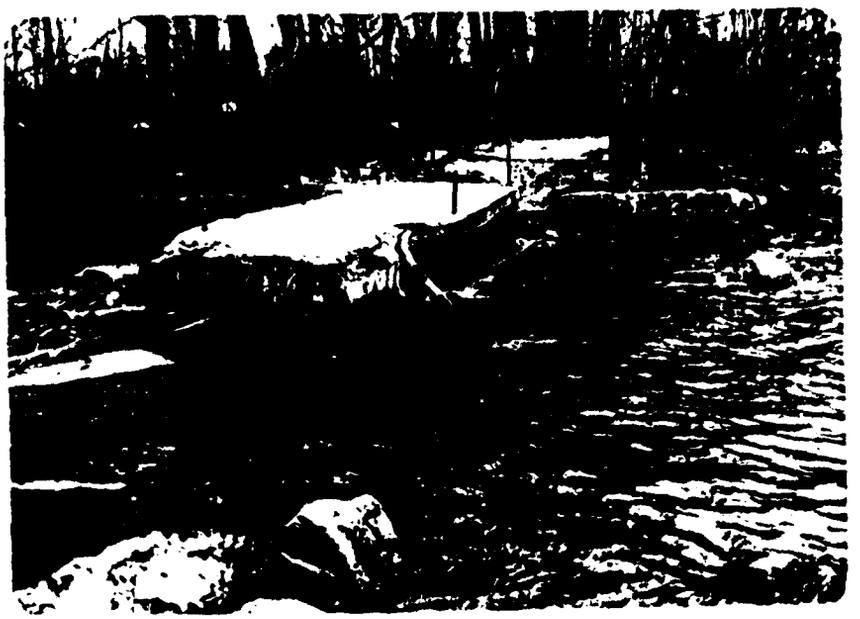


Photo 3. Remains of Structure for Lift Gate or Stoplogs
7 March 1981

Photo 4. Typical Overgrowth on Embankments
7 March 1981

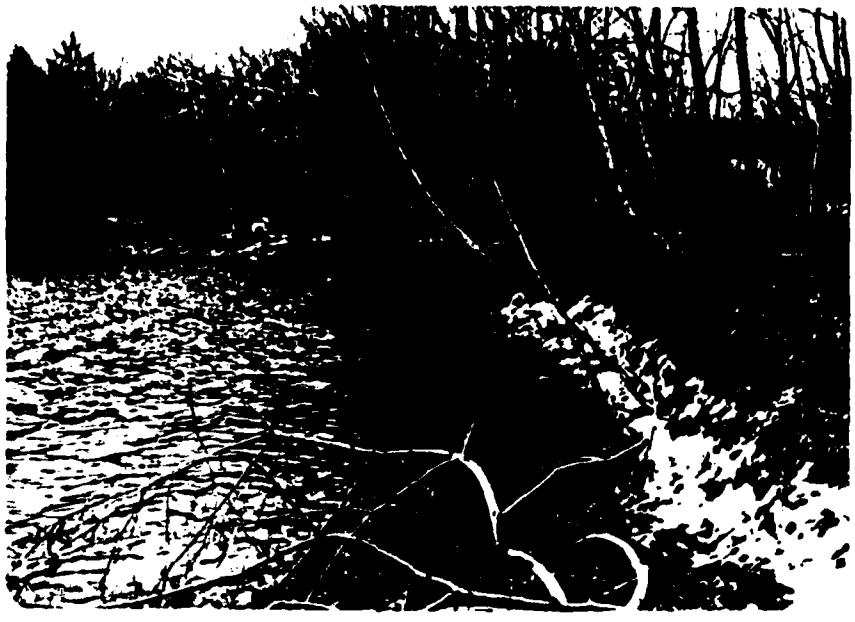


Photo 5. Upstream Slope of Left Embankment
7 March 1981

Photo 6. Downstream Stone Wall of Left Embankment
7 March 1981

Photo 7. Upstream Slope of Right Embankment
7 March 1981

Photo 8. Downstream Stone Wall of Right Embankment
7 March 1981

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Congers Lake Dam

Fed. I.D. # NY 972 DEC Dam No. 214A-290

River Basin Passaic River

Location: Town Congers County Rockland

Stream Name Each Branch Hackensack River

Tributary of Hackensack River

Latitude (N) 41°08.2' Longitude (W) 73°56.6'

Type of Dam Earth

Hazard Category High

Date(s) of Inspection 10 January 1981

Weather Conditions Clear, 10°F., 6 in. snow cover.

Reservoir Level at Time of Inspection Elevation 996.7 ft. T.B.M.*

b. Inspection Personnel Jeffrey A. Quay, Larry A. Diday, David W. Hupe

c. Persons Contacted (Including Address & Phone No.)

Ed Ghiazza - Superintendant of Recreation and Parks

10 Maple Avenue

New City, NY 10956

914/634-4100

d. History:

Date Constructed 1892 Date(s) Reconstructed 1912

1914

Designer Unknown

Constructed By St. Rita Lake Company

Owner Town of Clarkstown, NY

*Temporary Bench Mark (T.B.M.) is right downstream corner of concrete slab over right side of spillway. Assumed elevation is 1000.0 ft.

2) Embankment

a. Characteristics

(1) Embankment Material Sandy silt.

(2) Cutoff Type Driven wood sheathing.

(3) Impervious Core None

(4) Internal Drainage System None

(5) Miscellaneous

b. Crest

(1) Vertical Alignment Varies about 4 ft. from the minimum top of dam to the maximum top of dam.

(2) Horizontal Alignment Satisfactory

(3) Surface Cracks None were observed. However, snow covered the embankments.

(4) Miscellaneous Both crests were partly overgrown with large trees.

c. Upstream Slope

(1) Slope (Estimate) (V:H) Left embankment-1V:1.6H, Right embankment-1V:2H.

(2) Undesirable Growth or Debris, Animal Burrows Both embankments are heavily overgrown with brush and large trees.

(3) Sloughing, Subsidence, or Depressions The upstream slopes are moderately eroded. Wave action has caused a few vertical scarps approximately 2 ft. high at the water line.

(4) Slope Protection The upstream slopes should be completely riprapped; little riprap was observed during the visual inspection.

(5) Surface Cracks or Movement at Toe None was observed.

d. Downstream Slope

(1) Slope (Estimate - V:H) Nearly vertical stone retaining walls.

(2) Undesirable Growth or Debris, Animal Burrows The areas immediately downstream of the walls are heavily overgrown with trees.

(3) Sloughing, Subsidence or Depressions The retaining walls were observed to be in good condition. Runoff from the crests has slightly eroded the embankment materials from behind the walls locally.

(4) Surface Cracks or Movement at Toe None was observed.

(5) Seepage None was observed.

(6) External Drainage System (Ditches, Trenches, Blanket) None

(7) Condition Around Outlet Structure No outlets were observed.

(8) Seepage Beyond Toe None was observed.

e. Abutments - Embankment Contact

(1) Erosion at Contact None was observed.

(2) Seepage Along Contact None was observed.

3) Drainage System

a. Description of System None

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) None

5) Reservoir

a. Slopes The slopes are gentle and are moderately wooded or grass covered.

b. Sedimentation Sedimentation is expected to be minor.

c. Unusual Conditions Which Affect Dam Swartwout Lake Dam (earth) located upstream.

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) Five homes, located within 800 ft. downstream and Gilchrist Drive, which crosses the river 875 ft. below the dam.

b. Seepage, Unusual Growth None observed

c. Evidence of Movement Beyond Toe of Dam None observed

d. Condition of Downstream Channel The channel is a natural stream channel with trees and brush on the banks. The stream slope is shallow and the valley is wide with moderate side slopes.

7) Spillway(s) (Including Discharge Conveyance Channel)

a. General The spillway consists of an open, generally rectangular shaped channel and an open, trapezoidal shaped channel of broken concrete coated with asphalt. The two parts of the spillway are separated by a 3 ft. wide concrete pier.

b. Condition of Service Spillway The spillway is badly deteriorated. Only part of an old lift gate or stop log structure is still present. The left stone wall that originally protected the embankment has collapsed. The bottom of the spillway is very irregular and is partly protected from erosion by a combination of stone, concrete, and asphalt.

c. Condition of Auxiliary Spillway None

d. Condition of Discharge Conveyance Channel There is abundant riprap in the discharge channel. Some logs, railroad ties and other debris are present, but are not clogging the channel.

8) Reservoir Drain/Outlet - None

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

_____ _____

Invert Elevations: Entrance _____

Exit _____

Physical Condition (Describe): Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

_____

_____

Hydraulic Capability: _____

_____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

_____

_____

_____

_____

9) Structural - Not Applicable

a. Concrete Surfaces _____

_____

_____

_____

b. Structural Cracking _____

_____

_____

c. Movement - Horizontal & Vertical Alignment (Settlement) _____

_____

_____

d. Junctions with Abutments or Embankments _____

_____

_____

e. Drains - Foundation, Joint, Face _____

f. Water Passages, Conduits, Sluices _____

g. Seepage or Leakage _____

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates _____

l. Approach & Outlet Channels _____

m. Energy Dissipators (Plunge Pool, etc.) _____

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition None

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject CONGERS LAKE DAM S.O. No.
APPENDIX C - HYDROLOGY AND Sheet No. of
HYDROLOGIC CALCULATIONS Drawing No.
Computed by Checked by Date

SUBJECT	PAGE

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

		Elevation* (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1)	Top of Dam	998.7	130.5	466
2)	Design High Water (Max. Design Pool)	-	-	-
3)	Auxiliary Spillway Crest	-	-	-
4)	Pool Level with Flashboards	-	-	-
5)	Service Spillway Crest	996.4	112.3	187

DISCHARGES

		Volume (cfs)
1)	Average Daily	25
2)	Spillway @ Maximum High Water - Top of Dam -	337
3)	Spillway @ Design High Water	-
4)	Spillway @ Auxiliary Spillway Crest Elevation	-
5)	Low Level Outlet	-
6)	Total (of all facilities) @ Maximum High Water	337
7)	Maximum Known Flood	-
8)	At Time of Inspection	30

*Temporary Bench Mark (T.B.M.) is right downstream corner of concrete slab over right side of spillway. Assumed elevation is 1,000.0 ft.

CREST: ELEVATION: 998.7

Type: Earth, heavy tree vegetation.

Width: 16 ft. Length: 290 ft.-lt. emb, 268 ft.-rt. emb.

Spillover Open uncontrolled rectangular channel and trapezoidal channel.

Location Left side of left embankment.

SPILLWAY:

SERVICE		AUXILIARY
996.4 ft. T.B.M.	Elevation	None
Uncontrolled, open rectangular channel and trapezoidal channel	Type	
Rectangular ch. = 10 ft., trapezoidal ch. = 290 ft. @ min. top of dam elev.	Width	

Type of Control

X	Uncontrolled	
	Controlled:	
-	Type (Flashboards; gate)	
-	Number	
-	Size/Length	
	Invert Material	
	Anticipated Length of Operating Service	
-	Chute Length	
Unknown	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type: None were observed.

Location: _____

Records:

Date: _____

Max. Reading: _____

FLOOD WATER CONTROL SYSTEM:

Warning System: None

_____

Method of Controlled Releases (mechanisms):

None

_____

_____

_____

DRAINAGE AREA: Total above Congers Lake Dam = 4.10 sq. mi, drainage area above Rockland Lake = 2.31 sq.mi., drainage area between Swartwout Lake and Rockland Lake = 1.04 sq.mi., drainage area between Congers Lake and Swartwout Lake = 0.75 sq. mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS: For total D.A. (4.10 sq.mi.)

Land Use - Type: 38% Res., 31% wooded, 15% open, 16% lake surfaces.

Terrain - Relief: Wooded areas steeply sloped (10%-35%), residential areas moderately sloped (2%-10%), open areas mildly sloped (<5%).

Surface - Soil: Poor permeability

Runoff Potential (existing or planned extensive alterations to existing surface or subsurface conditions)

None

Potential Sedimentation problem areas (natural or man-made; present or future)

No sedimentation problem areas exist at the present time or are expected in the future. The steepest slopes in the drainage area are heavily wooded and are included in the Hoor Mountain State Park, thereby limiting future development in this area. The possibility of sedimentation problems at Congers Lake is almost nonexistent due to Rockland Lake and Swartwout Lake being located upstream of Congers Lake and the low stream gradient (approximately 0.2%) of East Branch Hackensack River between Congers Lake and Richland Lake.

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

There are no potential backwater problem areas for levels anticipated for the spillway design flood.

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter: None

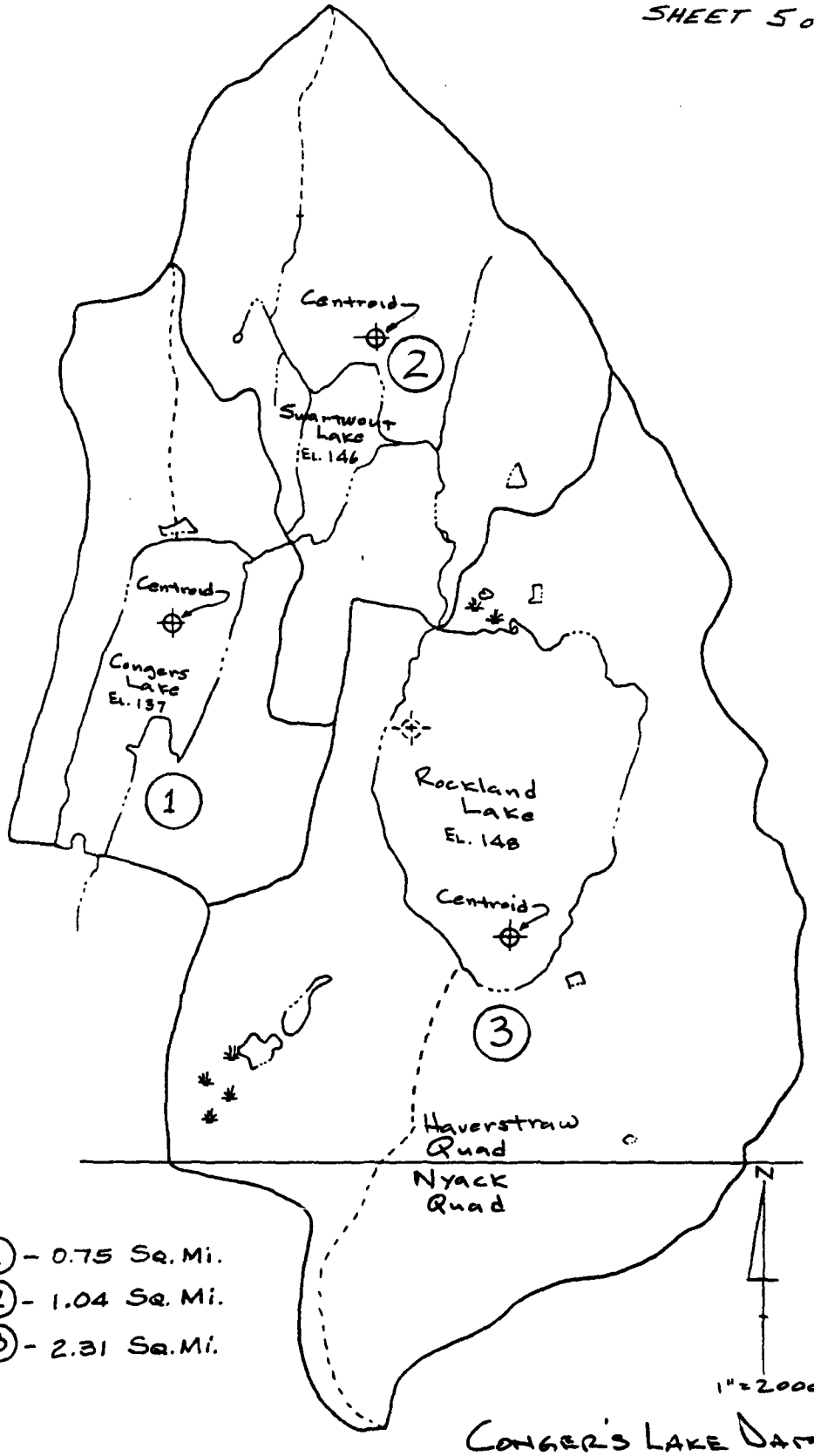
Location: _____

Elevation: _____

Reservoir:

Length @ Maximum Pool (Top of dam) 5,100 ft.

Length of Shoreline (@ Spillway Crest) 12,500 ft.



Drainage Area (1) - 0.75 Sq. Mi.
" (2) - 1.04 Sq. Mi.
" (3) - 2.31 Sq. Mi.

CONGER'S LAKE DAM
DRAINAGE AREA MAP

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject NEW YORK DAMS S.O. No. 3988-00-A&M-15
Sheet No. 6 of 28
CONGERS LAKE Dam Drawing No.
Computed by JE Checked by WJS Date 1/14/81

ROCKLAND LAKE Area (1)

DRAINAGE AREA - 48.29/3 = 16.09 in² = 1,477.8 Ac = 2.31 mi²
LAKE AREA ELEV 148 - 8.61/3 = 2.87 in² = 263.5 Ac = 0.41 mi²
ELEV 150 - 9.88/3 = 3.29 in² = 302.4 Ac = 0.47 mi²
ELEV 160 - 14.67/3 = 4.89 in² = 449.6 Ac = 0.70 mi²

L - 5.7 in - 11,400 ft = 2.16 mi
L_{CA} - 2.0 in - 4,000 ft. = 0.76 mi

SWARTWOUT LAKE Area (2)

DRAINAGE AREA - 21.76/3 = 7.25 in² = 666.1 Ac = 1.04 mi²
LAKE AREA ELEV 146 - 1.30/3 = 0.43 in² = 39.8 Ac = 0.06 mi²
ELEV 150 - 2.37/3 = 0.79 in² = 72.5 Ac = 0.11 mi²
ELEV 160 - 6.12/3 = 2.04 in² = 187.3 Ac = 0.29 mi²

L - 3.6 in - ~~7,200~~ 7,600 ft. = ~~1.36~~ 1.44 mi
L_{CA} - 1.5 in - ~~3,000~~ 3,200 ft. = ~~0.57~~ 0.61 mi

CONGERS LAKE Area (3)

DRAINAGE AREA - 15.61/3 = 5.20 in² = 477.8 Ac. = 0.75 mi²
LAKE AREA ELEV 137 - 3.67/3 = 1.22 in² = 112.3 Ac. = 0.18 mi²
ELEV 140 - 4.44/3 = 1.48 in² = 135.9 Ac. = 0.21 mi²
ELEV 150 - 6.21/3 = 2.07 in² = 190.1 Ac. = 0.30 mi²

L - 4.0 in - 8,000 ft. = 1.52 mi
L_{CA} - 1.5 in - 3,000 ft. = 0.57 mi

PRECIPITATION DATA

HMR-33 ZONE 1

PMP 24 hr. - 200 mi² = 21.8 inches
D.A. Less than 10 mi²

Duration	% of 200 mi²	inches
6 hr. PMP	111	24.20
12 hr "	123	26.81
24 hr. "	133	28.99
~~48~~ hr. "	142	30.96

TP-40

100YR - 24 hr Rainfall = 7.5 inches
" 12 hr " = 6.4 "
" 6 hr " = 5.3 "

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject New York Dams — S.O. No.
Congers Lake Dam — Sheet No. 7 of 28
Snyders Coeff. — Drawing No.
Computed by LAD — Checked by JAQ — Date 2/4/81

Snyders Unit Hydrograph Coefficients

Area (1) $C_p = 0.63$ $L = 2.16$ Mi.
$C_T = 2.0$ $L_{CA} = 0.76$ Mi.
$T_p = C_T (L \times L_{CA})^{0.3} = 2.0 (2.16 \times 0.76)^{0.3}$
$T_p = 2.32$ ✓

Area (2) $C_p = 0.63$ $L = 1.44$ Mi
$C_T = 2.0$ $L_{CA} = 0.61$ Mi
$T_p = C_T (L \times L_{CA})^{0.3} = 2.0 (1.44 \times 0.61)^{0.3}$
$T_p = 1.92$ ✓

Area (3) $C_p = 0.63$ $L = 1.52$ Mi.
$C_T = 2.0$ $L_{CA} = 0.57$ Mi.
$T_p = C_T (L \times L_{CA})^{0.3} = 2.0 (1.52 \times 0.57)^{0.3}$
$T_p = 1.92$ ✓

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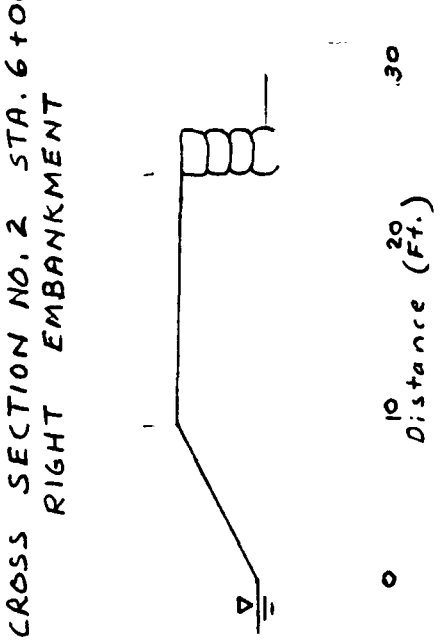
THE BAKER ENGINEERS

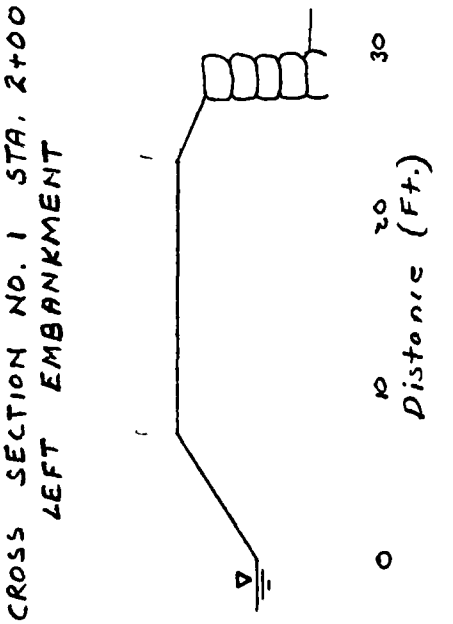
Box 280
Beaver, Pa. 15009

Subject NEW YORK DAMS — S.O. No.
CROSS-SECTIONS — Sheet No. 8 of 28
SONGERS LAKE — Drawing No.
Computed by DCK — Checked by — Date 1-15-81

CROSS SECTION NO. 2 STA. 6+00
RIGHT EMBANKMENT



CROSS SECTION NO. 1 STA. 2+00
LEFT EMBANKMENT



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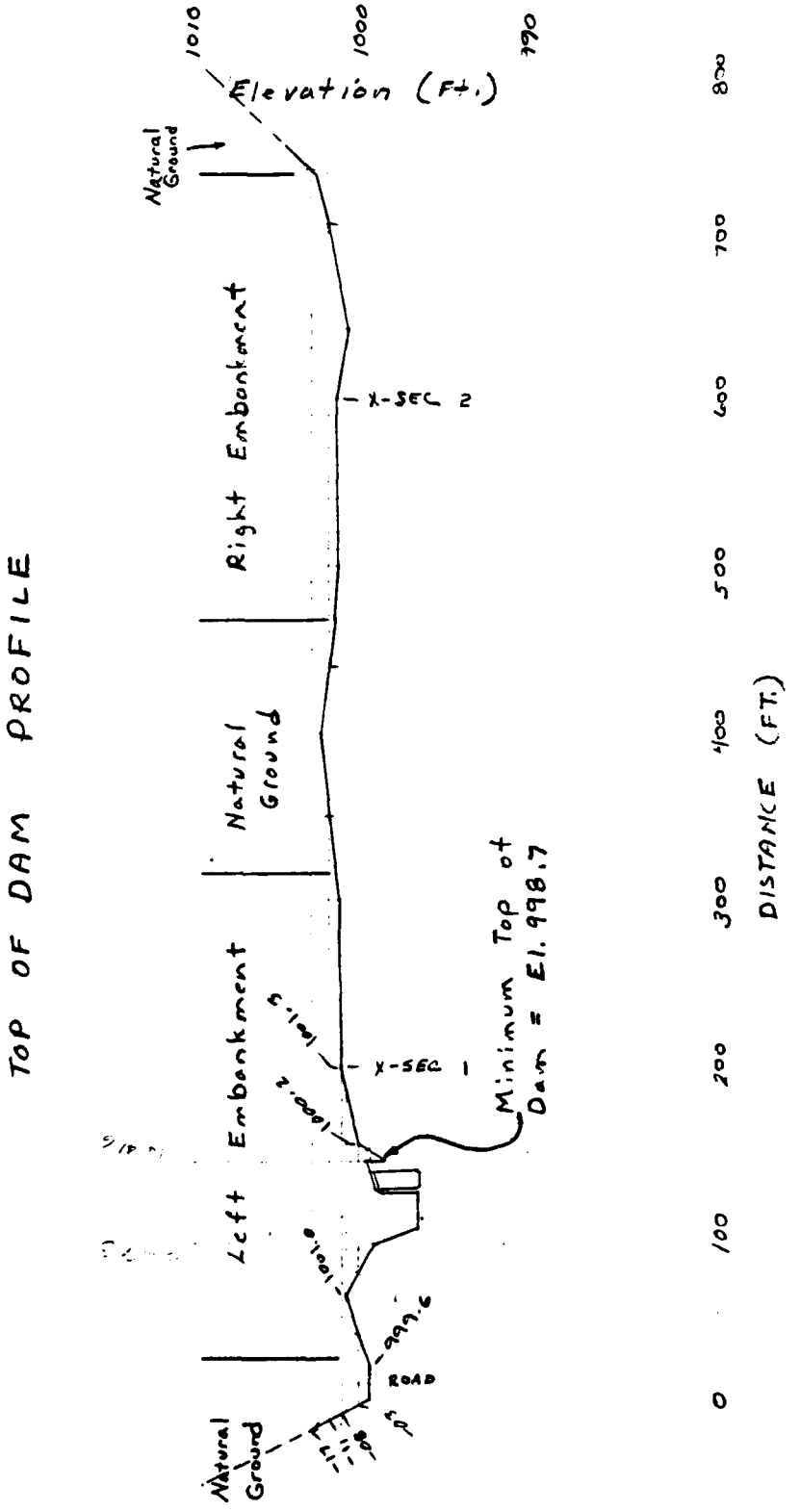
Box 280
Beaver, Pa. 15009

Subject NEW YORK DAMS S.O. No.
DAM PROFILE Sheet No. 9 of 28
CONGERS LAKE Drawing No.
Computed by DCK Checked by MLL Date 1-13-81



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Beaver, Pa. 15009

Subject New York Dam: Canari Lake Dam Spillway

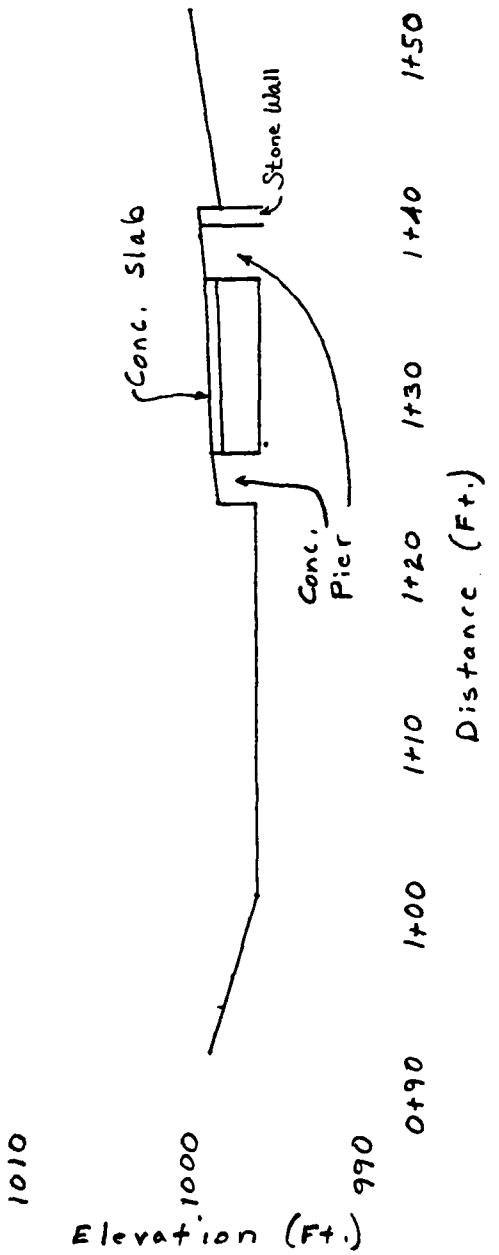
S.O. No.

Sheet No. 10 of 28

Drawing No.

Computed by LAJ Checked by Date 1/13/81

SPILLWAY PROFILE



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THE BAKER ENGINEERS
Box 280
Beaver, Pa. 15009

Subject New York Dam S.O. No.
Congers Lake Dam Sheet No. 11 of 28
Spillway Rating Drawing No.
Computed by LAD Checked by JAQ Date 4/14/81

Spillway Elevation (Ft.)	Depth Y (Ft)	Area A (Sq. Ft.)	Topwidth T (Ft.)	Hydraulic Depth $D = A/T$ (Ft.)	Velocity $V = \sqrt{gD}$ (Ft./sec.)	Flow $Q = AV$ (cfs)	Head $H = V^2/2g$ (Ft.)	Reservoir Elevation $E_R = E_s + H$ (Ft.)
(137.0) 996.4	0	0	32.5	0	0	0	0	996.4
(137.6) 997.0	0.6	15.3	33.9	0.45	3.81	58.3	0.23	997.2
(138.6) 998.0	1.6	50.8	37.2	1.37	6.63	336.8	0.68	998.7
(139.6) 999.0	2.6	85.6	40.5	2.11	8.25	706.2	1.06	1000.1
(140.6) 1000.0	3.6	129.4	48.6	2.66	9.26	1198.2	1.33	1001.3
(141.6) 1001.0	4.6	178.0	48.6	3.66	10.86	1933.0	1.83	1002.8
(142.6) 1002.0	5.6	226.6	48.6	4.66	12.25	2776.5	2.33	1004.3
(143.6) 1003.0	6.6	275.2	48.6	5.66	13.50	3716.1	2.83	1005.8

Note: el. 996.4 ± el. 137 M.S.L.
(adj. by 859.4)

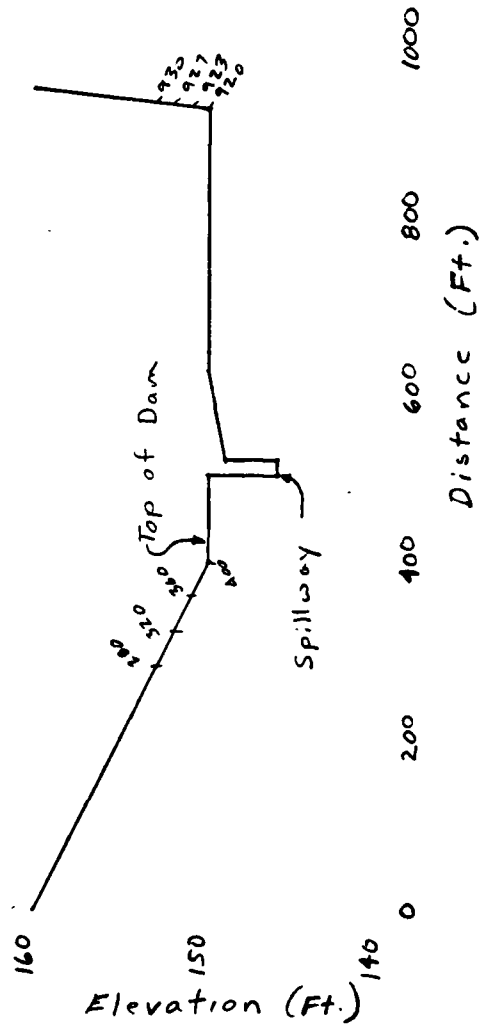
MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject New York Dams — S.O. No.
Swartwout Lake — Sheet No. 12 of 28
Spillway Rating — Drawing No.
Computed by GAD — Checked by — Date 1/16/81

PROFILE THROUGH SPILLWAY, TOP OF DAM, and ADJOINING AREAS

Spillway: Width = 19 Ft.
Breadth of Crest = 6 Feet
Crest = Broadcrested Weir



MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject New York Dams
Swartwout Lake
Spillway Rating

S.O. No.
Sheet No. 13 of 23
Drawing No.
Computed by LAD Checked by ALE Date 1/16/81

Weir Flow

$Q = C L H^{3/2}$

$L = 19$ Ft.

H varies from 0.4 Ft. to 7.0 Ft

C varies with H, Pg 5-40 Table 5-3 King and Brater Handbook

Elevation (Ft.)	H (Ft.)	L (Ft.)	C	Q (cfs)
146.	0	19.	0	0
146.5	0.5	19.	2.50	16.8
147.	1.0	19.	2.68	50.9
148.	2.0	19.	2.65	142.4
149.	3.0	19.	2.66	262.6
150.	4.0	19.	2.70	410.4
151.	5.0	19.	2.79	592.7
152.	6.0	19.	2.88	804.2
153.	7.0	19.	2.88	1013.4

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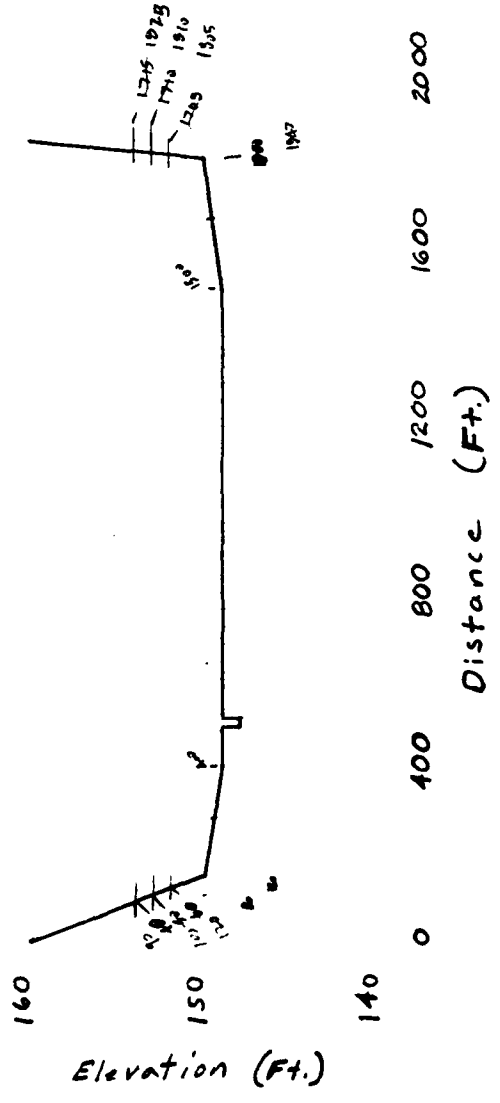
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject New York Dams — S.O. No.
Rockland Lake — Sheet No. 14 of 28
Spillway Rating — Drawing No.
Computed by LAD — Checked by — Date 1/16/81

PROFILE THROUGH NATURAL OUTLET
FOR LAKE and AJOINING AREAS

Outlet Channel : Width = 20 Ft.
Height = 1 Ft.



MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS
Box 280
Beaver, Pa. 15009

Subject New York Dams S.O. No.
Rocklead Lake Sheet No. 15 of 28
Spillway Rating Drawing No.
Computed by EAD Checked by MKB Date 1/19/81

Spillway Elevation (Ft.)	Depth Y (Ft.)	Area A (Sq. Ft.)	Topwidth T (Ft.)	Hydraulic Depth $D = A/T$ (Ft)	Velocity $V = \sqrt{gD}$ (Ft/sec)	Flow $Q = AV$ (cfs)	Head $H = V^2/2g$ (Ft.)	Reservoir Elevation $E_R = E_S + H$ (Ft.)
148.0	0	0	20.	0	0	0	0	0
149.0	1.0	20.	20.	1.0	5.67	113.5	0.5	149.5
150.0	2.0	40.	20.	2.0	8.02	321.0	1.0	151.0
151.0	3.0	60.	20.	3.0	9.83	589.7	1.5	152.5
152.0	4.0	80.	20.	4.0	11.35	907.9	2.0	154.0
153.0	5.0	100.	20.	5.0	12.69	1268.9	2.5	155.5
154.0	6.0	120.	20.	6.0	13.90	1668.0	3.0	157.0

SHEET 15 of 29

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  483 UPDATE         04 JUL 79
**********************************
          A1      NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
          A2      HYDROLOGIC AND HYDRAULIC ANALYSIS OF CONGERS LAKE DAM
          A3      UNIT HYDROGRAPH BY SNYDERS METHOD
          B    600       0      10       0       0       0       0       0      -4       0
          B1     5
          J      1       4       1
          J1   1.0    0.75     0.5    0.25
          K              1                                         1
          K1      RUNOFF HYDROGRAPH TO ROCKLAND LAKE (SUBAREA 3)
          M      1       1    2.31                                                         1
          P           21.0     111     123     133     142
          T                                                      1.0     0.1
          W   2.32    0.03
          X   -1.5   -0.05       2
          K      1       2                                         1
          K1      ROUTING FOR ROCKLAND LAKE (SUBAREA 3)
          Y                              1       1
          Y1     1                                          -1007.4      -1
          Y41007.4  1008.4  1009.4  1010.4  1011.4  1012.4  1013.4
          Y5     0   113.5   321.0   589.7   907.9  1268.9  1668.0
          $A     0   263.5   302.4   449.0
          $E 997.4  1007.4  1009.4  1019.4
          $$1007.4
          $D1008.4     2.4     1.5
          $L     0    1030    1350    1630    1650    1665    1690    1705
          $V1008.4  1008.3  1008.9  1009.4  1010.4  1011.4  1012.4  1013.4
          K      1       3                                         1
          K1      ROUTING FOR CHANNEL X-SEC D.S. OF ROCKLAND LAKE (SUBAREA 3)
          Y                              1       1
          Y1     1                                             -1
          Y6  0.03    0.04    0.08  1006.4  1019.4    3150  0.0006
          Y7     0  1019.4    1000  1009.4    1093  1007.4    1090  1006.4    1110  1006.4
          Y7  1110  1007.4    1170  1009.4    1770  1019.4
          K              4                                         1
          K1      RUNOFF HYDROGRAPH TO SWARTWOUT LAKE (SUBAREA 2)
          M      1       1    1.04                                                         1
          P           21.0     111     123     133     142
          T                                                      1.0     0.1
          W   1.72    0.03
          X   -1.5   -0.05       2
          K      2       5                                         1
          K1      COMBINE HYDROGRAPHS (SUBAREAS 1 + 2)
          K      1       6                                         1
          K1      ROUTING FOR SWARTWOUT LAKE (SUBAREA 2)
          Y                              1       1
          Y1     1                                          -1005.4      -1
          Y41005.4  1005.9  1006.4  1007.4  1008.4  1009.4  1010.4  1011.4  1012.4
          Y5     0    16.3    50.9   142.4   262.6   410.4   592.7   804.2  1013.4
          $A     0    39.3    72.5   187.3
          $E 995.4  1005.4  1009.4  1019.4
```

```
$$1005.4
$D1008.4     2.0     1.5
$L      0      130      500      544      588      631
$V1008.4   1009.4   1009.1   1010.4   1011.4   1012.4
K              7                                                  1
K1       RUNOFF HYDROGRAPH TO CONGERS LAKE (SUBAREA 1)
M        1         1     0.75                                                     1
P               21.3      111      123      133      142
T                                                               1.0      0.1
W     1.32     0.03
X    -1.2     -0.05        2
K        2         8                                              1
K1       COMBINE HYDROGRAPHS (SUBAREAS 1 & 2)
K        1         2                                              1
K1       ROUTING FOR CONGERS LAKE DAM (SUBAREA 1)
Y                                    1        1
Y1       1                                                    -996.4       -1
Y4 996.4     997.2     998.7   1000.0   1001.3   1002.8   1004.3   1005.8
Y5       0      58.3     336.9    706.2   1198.2   1933.0   2776.5   3716.1
$A       0     112.3     135.9    190.1
$E 991.4     996.4     999.4   1009.4
$$ 996.4
$D 998.7       2.0       1.5
$L       0         3        72      159      577      706
$V 998.7     999.6    1000.2   1001.3   1002.0   1003.0
K       99
```

SHEET 17 of 28

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	2
ROUTE HYDROGRAPH TO	3
RUNOFF HYDROGRAPH AT	4
COMBINE 2 HYDROGRAPHS AT	5
ROUTE HYDROGRAPH TO	6
RUNOFF HYDROGRAPH AT	7
COMBINE 2 HYDROGRAPHS AT	8
ROUTE HYDROGRAPH TO	9
END OF NETWORK	

SHEET 18 OF 28

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1973
 LAST MODIFICATION  26 FEB 79
 88J UPDATE         06 JUL 79
**********

RUN DATE 12/23/81
    TIME   11.43
```

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
HYDROLOGIC AND HYDRAULIC ANALYSIS OF CUNDLES LAKE DAM
UNIT HYDROGRAPH BY SNYDERS METHOD

JOB SPECIFICATION

NQ	NDD	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
600	0	10	0	0	0	0	0	-4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1
RTIOS= 1.00 0.75 0.50 0.25

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

RUNOFF HYDROGRAPH TO ROCKLAND LAKE (SUBAREA 3)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	2.31	0.0	2.31	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	21.80	111.00	123.00	133.00	142.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.10	3.0	0.0

UNIT HYDROGRAPH DATA
TP= 2.32 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -1.50 QRCSN= -0.05 RTIOR= 2.00

UNIT HYDROGRAPH 76 END-OF-PERIOD ORDINATES, LAG= 2.34 HOURS, CP= 0.64 VOL= 1.00

8.	23.	60.	96.	136.	178.	223.	268.	311.	347.
376.	397.	411.	416.	412.	399.	387.	340.	314.	290.
269.	243.	230.	212.	196.	181.	168.	155.	143.	133.
123.	113.	105.	97.	90.	83.	77.	71.	66.	61.

30.	32.	48.	44.	41.	38.	35.	32.	30.	28.
26.	24.	22.	20.	19.	17.	16.	15.	14.	13.
12.	11.	10.	9.	9.	8.	7.	7.	6.	6.
5.	5.	5.	4.	4.	4.				

END-OF-PERIOD FLOW

	NO.	DA	HR.	MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.	DA	HR.	MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
														SUM	24.76	21.06	3.71	188482.
															629.11	535.11	94.11	5337.221

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING FOR ROCKLAND LAKE (SUBAREA 3)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.0	0.0	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.0	0.0	0.0	-1007.	-1

STAGE	1007.40	1008.40	1009.40	1010.40	1011.40	1012.40	1013.40
FLOW	0.0	113.00	321.00	589.70	907.90	1268.90	1668.00
SURFACE AREA=	0.	264.	302.	449.			
CAPACITY=	0.	378.	1464.	5177.			
ELEVATION=	997.	1007.	1009.	1019.			

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1007.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1008.4	2.4	1.5	0.

CREST LENGTH AT OR BELOW ELEVATION	0.	1060.	1350.	1630.	1650.	1665.	1690.	17050.
	1008.4	1008.5	1008.9	1009.4	1010.4	1011.4	1012.4	1013.4

PEAK OUTFLOW IS 4999. AT TIME 42.33 HOURS

PEAK OUTFLOW IS 3675. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 2296. AT TIME 42.83 HOURS

PEAK OUTFLOW IS 781. AT TIME 44.00 HOURS

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********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING FOR CHANNEL X-SEC D.S. OF ROCKLAND LAKE (SUBAREA 3)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

JLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.0	0.0	1	1	0	0	0

ISTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.0	0.0	0.0	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELMVT	ELMAX	KLNTH	SEL
0.0800	0.0500	0.0300	1000.4	1019.4	3150.	0.00060

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.0 1019.40 1330.00 1009.40 1090.00 1007.40 1090.00 1006.40 1110.00 1005.40
1110.00 1007.40 1170.00 1009.40 1370.00 1019.40

STORAGE	0.0	0.49	2.35	5.97	12.13	21.38	35.82	55.68	80.95	111.04
	147.74	189.20	236.19	288.54	346.30	409.47	478.08	552.07	631.49	716.32
OUTFLOW	0.0	9.27	29.63	69.10	138.60	239.75	400.70	644.17	985.72	1440.11
	2021.23	2742.24	3615.71	4653.71	5867.83	7269.32	8869.08	10677.71	12702.25	14962.79
STAGE	1006.40	1007.08	1007.77	1008.45	1009.14	1009.82	1010.50	1011.19	1011.87	1012.56
	1013.24	1013.92	1014.61	1015.29	1015.98	1016.66	1017.35	1018.03	1018.71	1019.40
FLOW	0.0	9.27	29.63	69.10	138.60	239.75	400.70	644.17	985.72	1440.11
	2021.23	2742.24	3615.71	4653.71	5867.83	7269.32	8869.08	10677.71	12702.25	14962.79

MAXIMUM STAGE IS 1015.3

MAXIMUM STAGE IS 1014.5

MAXIMUM STAGE IS 1013.3

MAXIMUM STAGE IS 1011.2

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

RUNOFF HYDROGRAPH TO SWARTWOUT LAKE (SUBAREA 2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.04	0.0	1.04	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	21.80	111.00	125.00	133.00	142.00	0.0	0.0

SHEET NO. 23

TRSPC COMPUTED BY THE PROGRAM IS 0.300

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.10	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 1.92 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -0.05 RTIOR= 2.00

UNIT HYDROGRAPH 63 END-OF-PERIOD ORDINATES, LAG= 1.91 HOURS, CP= 0.63 VOL= 1.00

6.	21.	43.	68.	96.	125.	154.	181.	202.	216.
225.	227.	221.	205.	186.	169.	154.	140.	127.	115.
105.	95.	86.	79.	71.	65.	59.	53.	49.	44.
40.	36.	33.	30.	27.	25.	23.	20.	19.	17.
15.	14.	13.	11.	10.	9.	9.	8.	7.	6.
6.	5.	5.	4.	4.	4.	3.	3.	3.	2.
2.	2.	2.							

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	24.76	21.06	3.71	84990.
										(629.)(	535.)(	94.)(	2406.63)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS (SUBAREAS 1 + 2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING FOR SWARTWOUT LAKE (SUBAREA 2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.0	0.0	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.0	0.0	0.0	-1003.	-1

STAGE	1005.40	1005.30	1006.40	1007.40	1008.40	1009.40	1010.40	1011.40	1012.40
FLOW	0.0	16.30	50.90	142.40	262.60	410.40	592.70	804.20	1013.40

SURFACE AREA=	0.	40.	73.	187.
CAPACITY=	0.	133.	354.	1608.
ELEVATION=	995.	1005.	1009.	1019.

SHEET 22 of 28

ELEV	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1035.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1038.0	2.6	1.5	0.

CREST LENGTH AT OR BELOW ELEVATION	0.	100.	500.	544.	588.	631.
	1008.0	1009.4	1009.1	1010.4	1011.4	1012.4

PEAK OUTFLOW IS 6636. AT TIME 43.00 HOURS

PEAK OUTFLOW IS 4764. AT TIME 43.17 HOURS

PEAK OUTFLOW IS 2822. AT TIME 43.67 HOURS

PEAK OUTFLOW IS 799. AT TIME 65.50 HOURS

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

RUNOFF HYDROGRAPH TO CONGERS LAKE (SUBAREA 1)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
7	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.75	0.0	0.75	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	21.80	111.00	123.00	133.00	142.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.000

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOR	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.10	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 1.92 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -0.05 RTIOR= 2.00

UNIT HYDROGRAPH 63 END-OF-PERIOD ORDINATES, LAG= 1.91 HOURS, CP= 0.63 VOL= 1.00

4.	15.	31.	49.	69.	90.	111.	130.	145.	156.
162.	164.	159.	148.	134.	122.	111.	101.	92.	83.
76.	69.	62.	57.	51.	47.	42.	39.	35.	32.
29.	26.	24.	22.	20.	18.	16.	15.	13.	12.
11.	10.	9.	8.	8.	7.	6.	6.	5.	5.
4.	4.	3.	3.	3.	3.	2.	2.	2.	2.
2.	1.	1.							

SHEET 23 of 48

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

```
                                                                                  SUM  24.76  21.06   3.71   61290.
                                                                                     ( 629.)( 535.)(  94.)( 1735.54)

          **********          **********          **********          **********          **********

                                              COMBINE HYDROGRAPHS

                          COMBINE HYDROGRAPHS (SUBAREAS 1 & 2)

                                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                      8       2       0       0       0       0       1       0       0

          **********          **********          **********          **********          **********

                                              HYDROGRAPH ROUTING

                          ROUTING FOR CONGERS LAKE DAM (SUBAREA 1)

                                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                      9       1       0       0       0       0       1       0       0
                                                       ROUTING DATA
                          QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                            0.0     0.0     0.0       1       1       0       0               0

                                  NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                      1       0       0     0.0     0.0     0.0   -996.      -1

  STAGE        996.40     997.20     998.70    1000.00    1001.30    1002.80    1004.30    1005.80

   FLOW          0.0       58.30     336.90     706.20    1198.20    1933.00    2776.50    3716.10

SURFACE AREA=       0.       112.       136.       190.

    CAPACITY=       0.       187.       559.      2181.

   ELEVATION=     991.       996.       999.      1009.

                           CREL   SPWID   COQW    EXPW   ELEVL    COQL   CAREA    EXPL
                          996.4     0.0    0.0     0.0     0.0     0.0     0.0     0.0

                                                  DAM DATA
                                        TOPEL    COQD    EXPD   DAMWID
                                        998.7     2.6     1.5      0.

  CREST LENGTH          0.        3.        72.       159.       577.       706.
  AT OR BELOW
  ELEVATION          998.7     999.6     1000.2     1001.3     1002.0     1003.0

PEAK OUTFLOW IS     7832. AT TIME  43.17 HOURS

PEAK OUTFLOW IS     5327. AT TIME  43.67 HOURS

PEAK OUTFLOW IS     2521. AT TIME  45.00 HOURS

PEAK OUTFLOW IS      480. AT TIME  49.17 HOURS
```

SHEET 24 of 28

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	RATIO 2 0.75	RATIO 3 0.50	RATIO 4 0.25
HYDROGRAPH AT	1	2.31	1	5242.	3934.	2621.	1311.
		(5.98)	(	148.44)(	111.33)(	74.22)(	37.11)(
ROUTED TO	2	2.31	1	4959.	3675.	2276.	781.
		(5.98)	(	141.57)(	104.06)(	65.03)(	22.10)(
ROUTED TO	3	2.31	1	4713.	3419.	2082.	675.
		(5.98)	(	133.45)(	96.81)(	58.96)(	19.10)(
HYDROGRAPH AT	4	1.03	1	2620.	1965.	1310.	655.
		(2.69)	(	74.20)(	55.65)(	37.10)(	18.55)(
2 COMBINED	5	3.33	1	6709.	4824.	2875.	801.
		(8.68)	(	189.82)(	136.61)(	81.42)(	24.56)(
ROUTED TO	6	3.33	1	6636.	4764.	2822.	799.
		(8.68)	(	187.91)(	134.91)(	79.92)(	22.63)(
HYDROGRAPH AT	7	3.75	1	1890.	1417.	945.	472.
		(1.94)	(	53.51)(	40.13)(	26.75)(	13.38)(
2 COMBINED	8	4.13	1	8091.	5784.	3399.	903.
		(10.62)	(	229.10)(	163.78)(	96.26)(	25.56)(
ROUTED TO	9	4.13	1	7842.	5327.	2921.	480.
		(10.62)	(	221.79)(	150.84)(	71.39)(	13.59)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1007.40	1007.40	1008.60
STORAGE	878.	878.	1151.
OUTFLOW	0.	0.	114.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1007.54	1.14	1480.	4993.	17.83	42.33	0.0
0.75	1007.35	0.95	1428.	3675.	16.67	42.50	0.0
0.5	A 0.1	.1	15.	20	4.8	4.3	.
0.25	1008.76	0.36	1253.	781.	11.50	44.00	0.0

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	4713.	1015.3	43.00
0.75	3519.	1014.5	43.33
0.50	2082.	1013.3	43.67
0.25	675.	1011.2	45.17

SHEET 24 OF 28

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1005.40	1005.40	1008.40
STORAGE	133.	133.	280.
OUTFLOW	0.	0.	263.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1011.49	3.09	526.	6630.	10.17	44.00	0.0
0.75	1011.01	2.61	483.	4704.	17.00	43.17	0.0
0.50	1010.42	2.02	433.	2822.	15.00	43.07	0.0
0.25	1009.54	1.14	365.	739.	11.33	45.50	0.0

SHEET 24 OF 43

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	996.40	996.40	998.70
STORAGE	187.	187.	460.
OUTFLOW	0.	0.	337.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1003.31	4.61	1129.	7832.	22.17	43.17	0.0
0.75	1002.74	4.04	1042.	5327.	21.00	43.67	0.0
0.50	1001.82	3.12	903.	2521.	19.00	45.00	0.0
0.25	999.20	0.50	542.	480.	11.00	49.17	0.0

SHEET 29 OF 43

APPENDIX D

REFERENCES

REFERENCES

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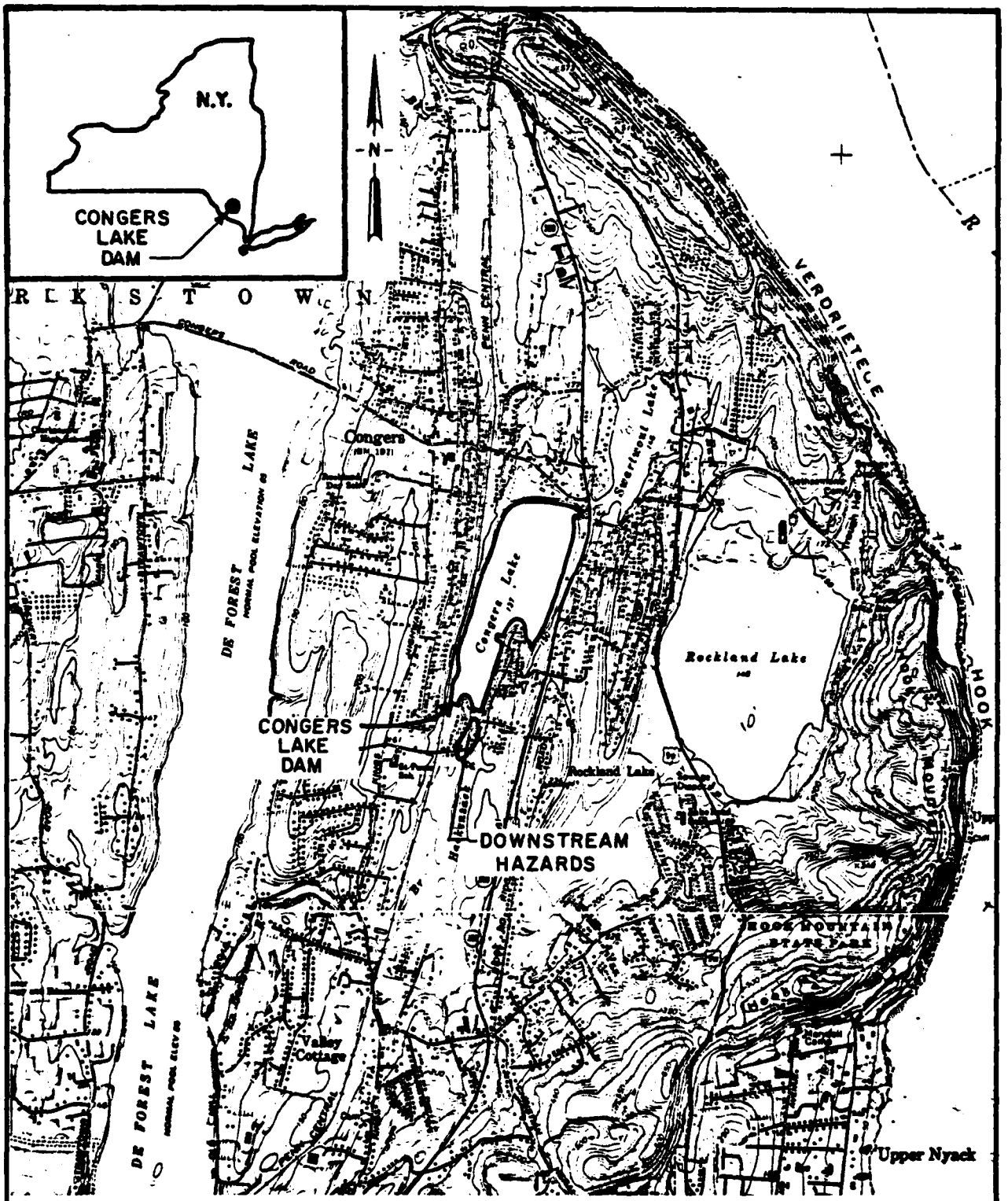
APPENDIX E

DRAWINGS

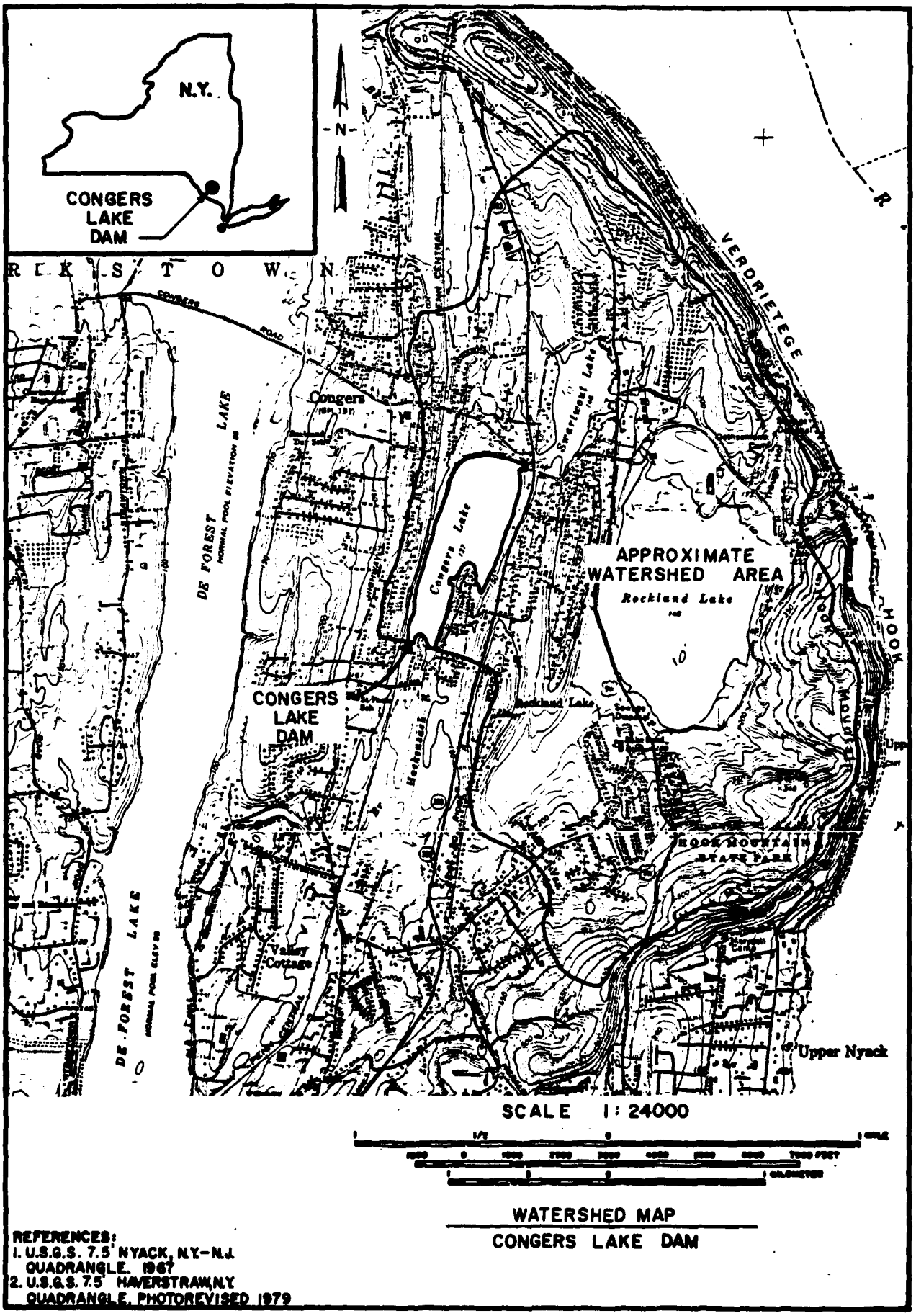
CONTENTS



LOCATION PLAN

CONGERS LAKE DAM

REFERENCES:
1. U.S.G.S. 7.5' NYACK, N.Y.-N.J. QUADRANGLE. 1957
2. U.S.G.S. 7.5' HAVERSTRAW, N.Y. QUADRANGLE. PHOTOREVISED 1979

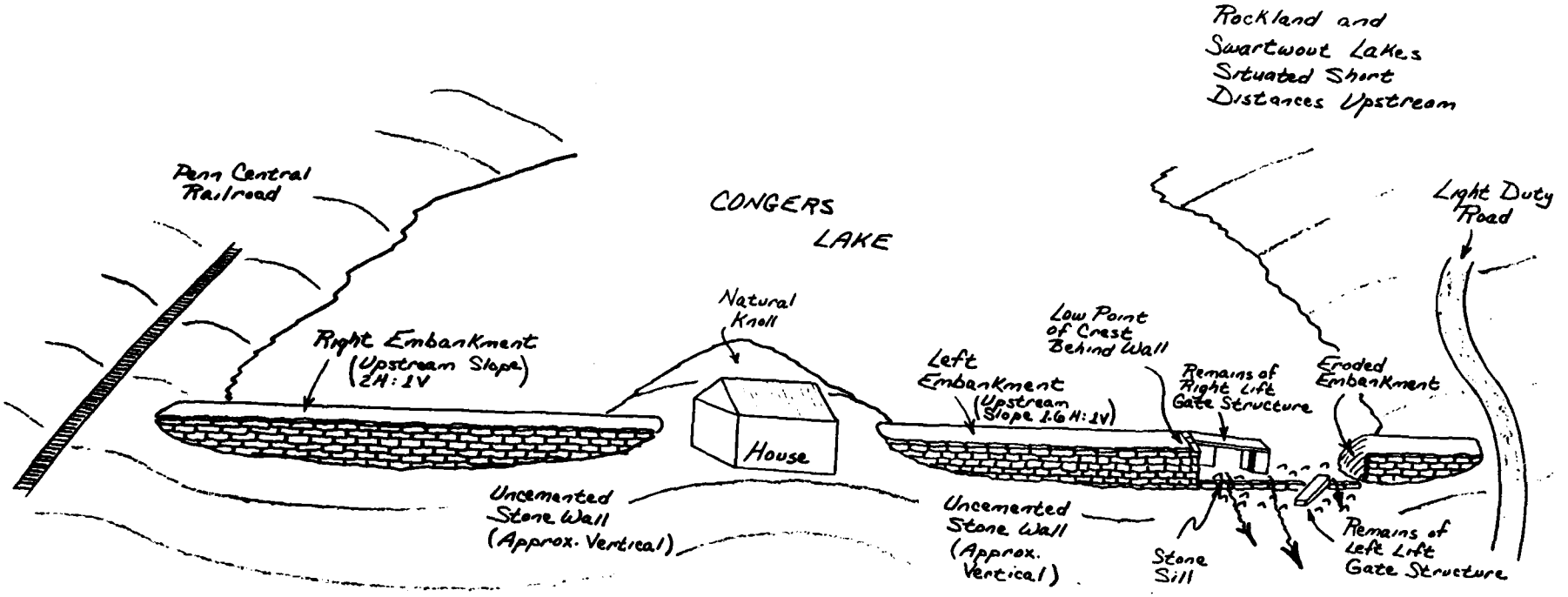


WATERSHED MAP

CONGERS LAKE DAM

REFERENCES:

1. U.S.G.S. 7.5' NYACK, N.Y.-N.J. QUADRANGLE. 1967
2. U.S.G.S. 7.5' HAVERSTRAW, N.Y. QUADRANGLE. PHOTOREVISED 1979



—Not to Scale—

FIELD SKETCH

CONGERS LAKE DAM, NEW YORK

Michael Baker, Jr., Inc.

10 January 1981

PLATE 1

DWH 1-81

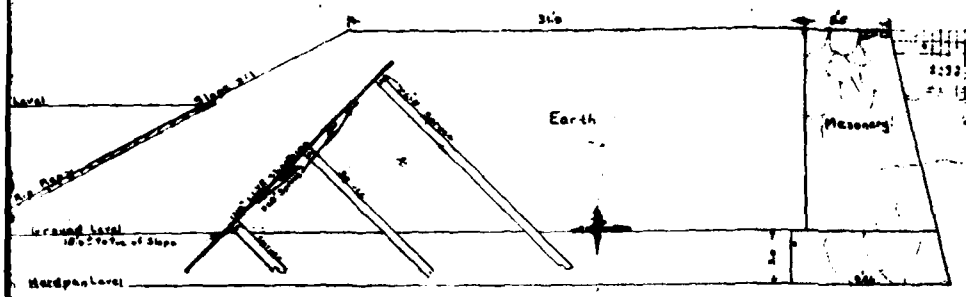
Location

Scale 400 = 1 inch

Cross Section B-B

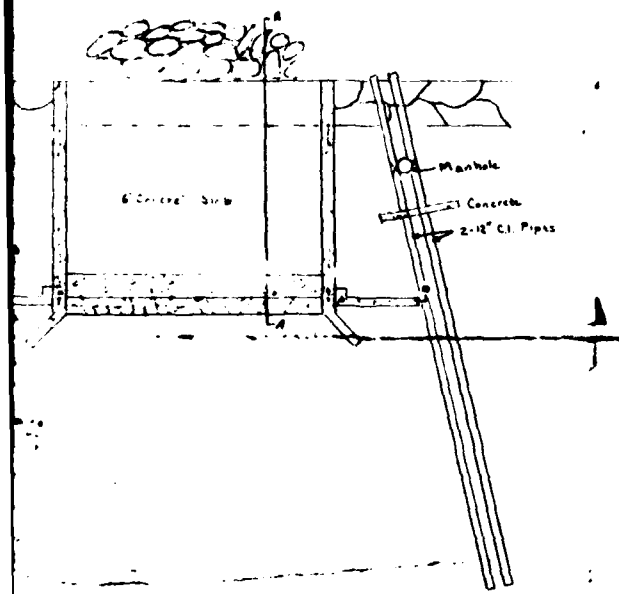
Scale 5'= 1 inch

Profile of Dam



Typical Cross Section of Dam

Scale 5'=1inch



Plan of Spillway

Scale 10'=1inch

GENERAL PLAN OF DAM

AT SOUTH END OF

ST RITA'S LAKE

Congers, Rockland Co. N.Y.

Property of

ST RITA'S Lake Co.

2

PLATE 2

APPENDIX F

BACKGROUND DOCUMENTS

150

RECEIVED
1914
DIVISION INLAND WATERS
Chief Engineer

St. Nicholas Rectory

REV. JOHN A. NAGELEISEN, P. R.
RECTOR

135 SECOND STREET
NEW YORK

November 12,1914

Dam Serial No 151
No 290 Lower Hudson River
Warrensburg

Richard W. Sherman, Chief Engineer,

Conservation Commission, Albany.

Dear Sir:-

The General Plan of Dam and its Spillway, the map of which was compiled by John A. Lee, C.E., March 27,1914, gives the minute description of the Dam and the manner in which it was built in the early years of the 90's of the last century and repaired in the Summer of 1912.

I have filed with The St. Rita Lake Company the set of Resolutions which the Commission officially adopted and approved on the 8th of April 1914 and you so graciously sent me under the date of October 30, 1914. My sincerest thanks for the courtesy extended to me in this matter. I am

Yours very respectfully,

John A. Nageleisen.

COM'R MOORE.

Form No. 1W66.

RECEIVED FEB 16 DIVISION INLAND WATERS Chief Engineer

GEORGE E. VAN KENNEN, CHAIRMAN
JAMES W. FLEMING
COMMISSIONERS
ALBERT SECRETARY
JOHN J. FARRELL, ASST. SECRETARY

STATE OF NEW YORK

Dam No. 290
Lower Hudson Watersh

DIVISION OF INLAND WATERS
JOHN D. MOORE, COMMISSIONER
JAMES J. FOX, DEPUTY COMMISSIONER
RICHARD W. SHERMAN, CHIEF ENGINEER
ALEX. RICE MCKIM, INSPECTOR OF DOCKS AND DAMS

CONSERVATION COMMISSION
ALBANY

RECEIVED
FEB 7 1914
DIVISION INLAND WATERS
J. D. M.

Serial No. *151*

Application filed *March 30 - 1914*

Approved by Commission

Material Tag No.

Foundations inspected

Final inspection

RECEIVED *
FEB 16 1914
DIVISION INLAND WATERS
J. D. M.

* *Resubmitted with new signature*

APPLICATION FOR CONSTRUCTION OR RECONSTRUCTION OF A DAM

#198 Congers N.Y.
(Address of Applicant)

Application is hereby made to the Conservation Commission of the State of New York, in compliance with the provisions of Chap. LXV of the Consolidated Laws, the Conservation Law, for approval of the detailed specifications and plans, marked

herewith submitted, for the { ~~Repairs~~ Construction ~~reconstruction~~ } of the dam herein described. All provisions of law will be complied with in the erection of the said dam, whether specified herein or not.

Feb. 3 - 14
(Date)

Signature of Applicant *"St. Rita Lake Co."*
Clarkstown, Rockland Co. N.Y.
per John A. Nageleisen, Secr.

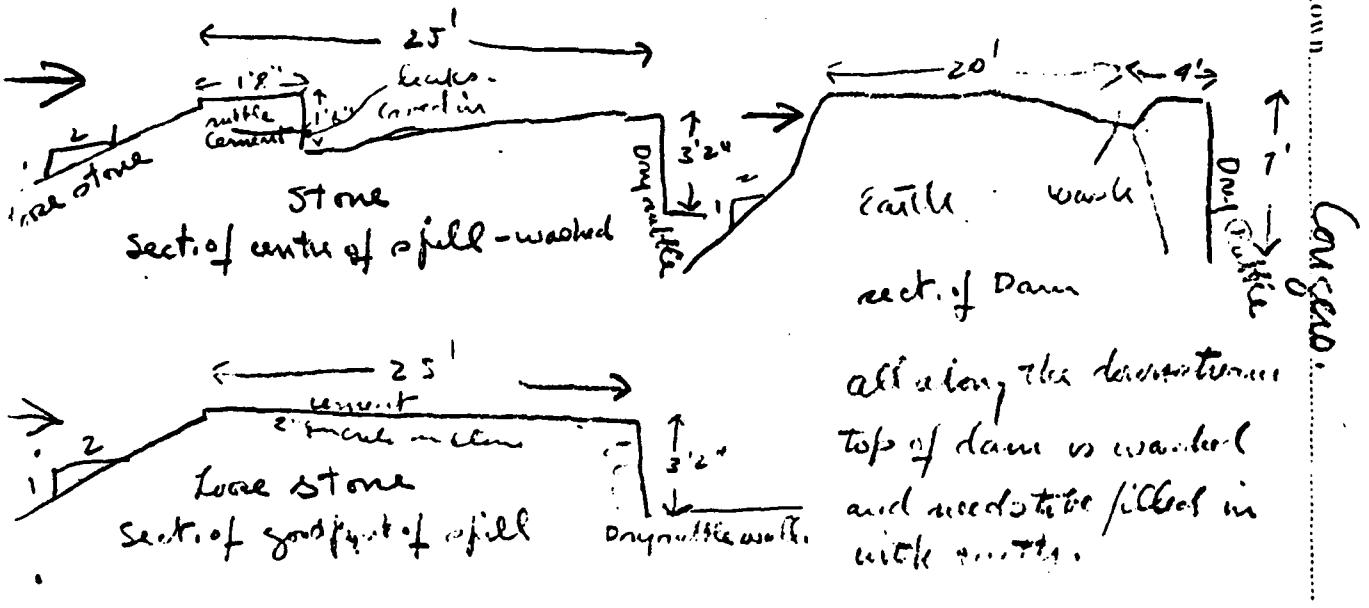
214 F

15-00-11-5000 (16-10687)

Fill out a form as complete as possible for each dam in your district and send to State Conservation Commission, Albany, N. Y.

1. Name and address of owners County has tax title - Longs Board of Trade Plan
2. Date of construction 1900
3. Uses of impounded water Clearance
4. Character of foundation bed Earth + Hard Pan
5. Material of waste spill Cement
6. Length of waste and depth below dam 27' x 3'
7. Total length of dam including waste 440'
8. Material of dam Earth
9. Discharges, size and location No discharge.

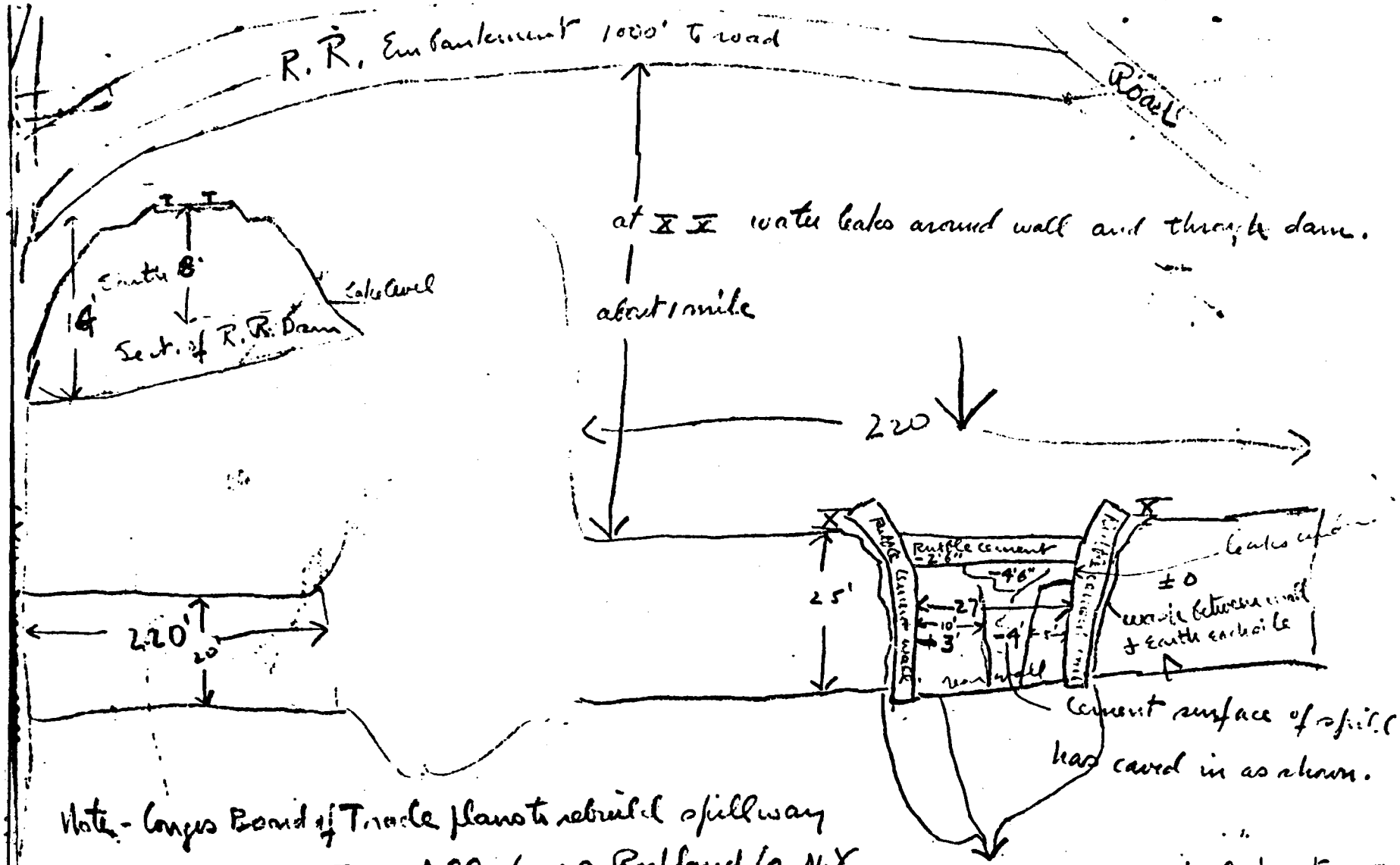
Below sketch section of waste and section of dam, with greatest heights and top thickness and bottom thickness. On opposite side sketch general plan of dam and give distance from a bridge or from a tributary stream.



7/6/12 A. F. Richards

(Signature, address and date.)

98-12 U R Nut.



Note - Longyear Board of Trade plans to rebuild spillway

Address Sect., G. F. Odell, Longyear, Rockland Co. N.Y.

290 H7

LOCATION AND GENERAL DATA

Site of dam is on South end of St Rita's Lake (New Lake or McGinnis Lake
(Name of stream)
a ~~branch~~ of Inflow from Swartwout Lake, within the
(Name of stream)
limits of the town of Clarkstown, County of Rockland
1½ mile south west of Rockland Lake, 1 mile south of Congers
(Give approximate distance from well-known bridge, dam, village or mouth of stream, so that work can be located on map of state)

Purpose of dam Pleasure purposes (It was built for ice crops originally and to cover the low lying swamps in the midst of Congers by the promoters)

Reasons for making changes in existing structure Repairs made to spillway only because of its leaking condition for 3 or 4 ft below crest.

DATA AND DIMENSIONS

General: Dam as constructed 1892

Materials of which dam is to be constructed Earth + rock fill, masonry & concrete.

Area of watershed above dam Three & four square miles.

Area of water surface of pond at level of spillway crest About 920 acres.

Capacity of reservoir (at above level) Nine million cubic feet.

Length of spillway crest Thirty feet feet.

Maximum depth of water on spillway crest ~~Eight~~ THREE® feet.

Maximum discharging capacity of spillway About ~~Three~~ five hundred® cubic feet per second.

Maximum discharging capacity of spillway per square mile of drainage area ~~Three hundred~~ One hundred® cubic feet per second.

®RMS

Masonry or timber portion: Spillway + wingwalls

Length on top ..... Forty ..... feet.

Length in stream bed ..... Fifty ..... feet.

Maximum height above stream bed ..... Eight + ten and one half respectively ..... feet.

Maximum height above foundation bed ..... Thirteen and one half + sixteen respectively ..... feet.

Maximum width of base ..... Five ..... feet.

Maximum width of top ..... Two ..... feet.

Elevation of top above maximum water level in pond ..... Two ..... feet.

Elevation of top above spillway crest ..... Two and one half ..... feet.

Nature of foundations ..... Red sand stone .....

Earth portion:

Embankment:

Length on top ..... Four hundred + fifty ..... feet.

Length in stream bed ..... Four hundred ..... feet.

Maximum height above stream bed ..... Fourteen ..... feet.

Maximum width of base ..... Sixty ..... feet.

Maximum width of top ..... Thirty five ..... feet.

Elevation of top above maximum water level in pond ..... Four to five ..... feet.

Elevation of top above spillway crest ..... Four and one half to five and one half ..... feet.

Slope, upstream face ..... one to two and one half or three .....

Slope, downstream face ..... ten to one .....

Core wall:

Material .....

Elevation of top above spillway crest ..... core wall ..... feet.

Width of top ..... feet.

Batter of faces .....

Maximum height above foundations ..... feet.

Maximum width of base ..... feet.

Sheeting or other cut-off Two inch sheeting driven length of dam on lake side

Is fishway provided? No.

General description of regulating works, gate houses, outlet pipes, penstocks, forebays, canals, flashboards, gates, log chutes, etc.

Two 12" C.I. pipes layed along old bed of stream

Names of owners of property which will be submerged by construction of dam, with approximate submerged area owned by each.

None

It is intended to complete work covered by this application by .....
(Date)

REPORT UPON APPLICATION

CONSERVATION COMMISSION — DIVISION OF INLAND WATERS

Albany April 6 - 14

I have carefully examined the plans of the above dam, and find that if the work is constructed in accordance with the plans, filed March 30 - 1914 with good workmanship and the specified materials that it will be safe.

Approved:

R V S
Chief Engineer.

Inspector of Docks and Dams.

APPROVAL BY COMMISSION

STATE OF NEW YORK

CONSERVATION COMMISSION

ALBANY

On April 5 1916 the Conservation Commission, by resolution duly adopted, approved of the above application for the { ~~construction~~ / reconstruction } of dam 290 Lower Hudson on Outlet of St Regis Lake and hereby gives permission for the { ~~construction~~ / reconstruction } of said dam within one months from date in accordance with the specifications and plans, and subject before erection to the approval by the Inspector of the materials of construction and of the foundation bed when stripped and prepared, and subject to the inspection of the work during and after construction. This approval may be amended if deemed necessary to secure a safe structure.

(Seal)

Secretary to Commission.

REPORT ON INSPECTION OF FOUNDATION

CONSERVATION COMMISSION — DIVISION OF INLAND WATERS

Albany.....

Work on the above dam was started....., contracts for the same having been awarded to.....

.....

On .....

.....

.....

.....

Approved: .....

Inspector of Docks and Dams.

.....

Chief Engineer.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DAM INSPECTION REPORT
(By Visual Inspection)

Town of Clarkstown owner

Dam Number	River Basin	Town	County	Hazard Class*	Date & Inspector
290	L. Hudson	Clarkstown	Rockland	B - C	1/19/73 KJH

Type of Construction

- ☐ Earth w/concrete spillway
- ☐ Earth w/drop inlet pipe
- ☑ Earth w/stone or riprap spillway + Asphalt
- ☐ Concrete
- ☐ Stone
- ☐ Timber

Use

- ☐ Water Supply
- ☐ Power
- ☑ Recreation
- ☐ Fish and Wildlife
- ☐ Farm Pond
- ☐ No Apparent Use-Abandoned

Estimated Impoundment Size

- ☐ 1-5 acres
- ☐ 5-10 acres
- ☑ Over 10 acres

Estimated Height of Dam above Streambed

- ☑ Under (10) feet
- ☐ 10-25 feet
- ☐ Over 25 feet

Condition of Spillway

- ☑ Service satisfactory
- ☐ In need of repair or maintenance
- ☐ Auxiliary satisfactory
- ☐ In need of repair or maintenance

Explain: Concrete has broken away but asphalt has been placed in spillway

Condition of Non-Overflow Section

- ☑ Satisfactory
- ☐ In need of repair or maintenance Explain: Minor leaks

Condition of Mechanical Equipment

- ☐ Satisfactory
- ☐ In need of repair or maintenance Explain: _____

Evaluation (From Visual Inspection)

- ☑ No defects observed beyond normal maintenance
- ☐ Repairs required beyond normal maintenance

*Explain Hazard Class, if Necessary _____

CE-6 (10/74)

congers Lake

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
290	L. Hudson	Clarkstown	Rockland	C	4/18/80 FFF/R.

Stream = E. Br Hackensack R., Owner = Town of Clarkstown

Type of Construction

- [X] Earth w/Concrete Spillway & Asphalt
- [ ] Earth w/Drop Inlet Pipe
- [ ] Earth w/Stone or Riprap Spillway
- [ ] Concrete
- [ ] Stone
- [ ] Timber
- [ ] Other _____

Use

- [ ] Water Supply
- [ ] Power
- [X] Recreation - [ ] High Density
- [ ] Fish and Wildlife
- [ ] Farm Pond
- [ ] No Apparent Use-Abandoned
- [ ] Flood Control
- [ ] Other _____

Estimated Impoundment Size 120 Acres## Estimated Height of Dam above Streambed 20 Ft.

Condition of Spillway

- [ ] Service satisfactory
- [X] In need of repair or maintenance
- [ ] Auxiliary satisfactory
- [ ] In need of repair or maintenance

Explain: Asphalt on section of Spillway that is Broken away and Erosion around Spillway.

Condition of Non-Overflow Section

- [ ] Satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Condition of Mechanical Equipment

- [ ] Satisfactory
- [ ] In need of repair or maintenance

Explain: None

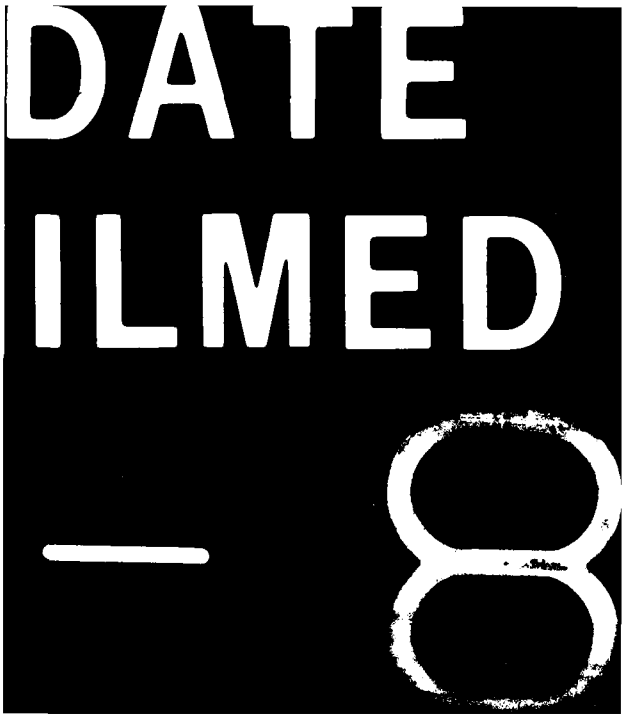
Siltation ? [ ] High [ ] Low

Explain: _____

Remarks: Trees on Dam Embankment

Evaluation (From Visual Inspection)

- [X] Repairs req'd. beyond normal maint.
- [ ] No defects observed beyond normal maint.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